

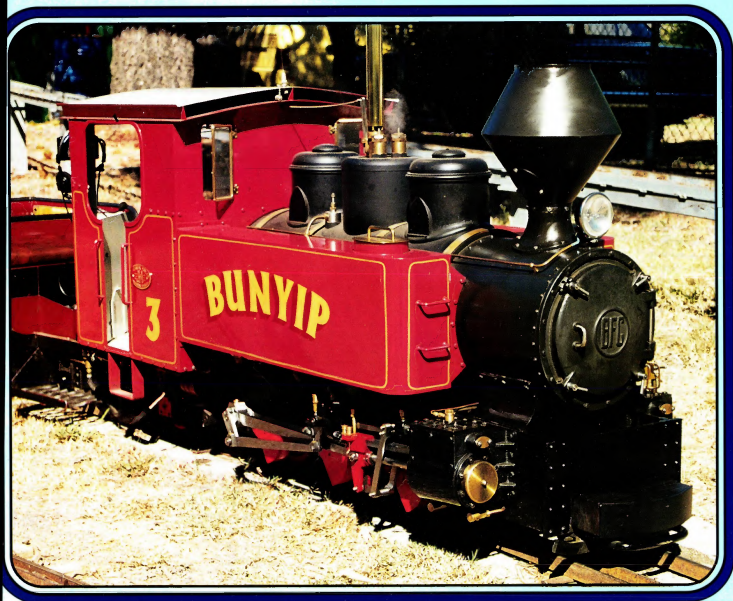
Australian Model Engineering

July-August 1998

Issue 79

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Issue 79

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The Cover

Ian Smith's Bundaberg Fowler cane loco, Bunyip, seen here on its home track in Canberra, is the subject of our major construction project commencing on page 27. Now you too can build one of these simple 7¼" gauge locomotives.

Photo by: David Proctor



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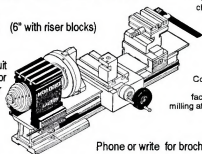


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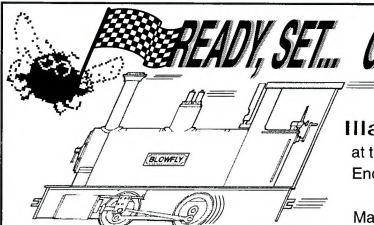
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Comment

When is enough enough?

Red tape, that is!

In recent years the miniature railway side of our hobby has been forced to embrace safer operating procedures and become more accountable. On one hand we have the responsibility of self-regulation plus insurers' requirements, and on the other, we have the AALS Code for Operators..., the AALS Code for Training..., and our Boiler Codes.

Most of us appreciate the need to protect ourselves when we are operating in contact with other people. I understand the need for protection and I think that by now we are all aware of the need to be able to prove duty of care, safe operation and adherence to the regulations that are in place. I know I would not like to lose my house in order to pay out a damages claim to anyone injured at my club

It has recently become rather obvious from conversations at conventions and rallies as well as chit chat in such fora as the COALS internet line, that there are many people in this hobby who feel we have gone too far with rules and regulations. Equally, there are those who think we now have it right and that adherence to the previously mentioned codes of practice gives us all the protection we need, while there are also those who still think we have not gone far enough, and wish to introduce extra rules on a club by club basis.

Who is right? — remembering that the AALS Codes and Boiler Codes satisfy the insurers and the AALS Codes and Boiler Codes satisfy the regulatory bodies.

We all know the best way to make our models really work and at the same time, raise funds to develop facilities that we can enjoy is by hauling paying passengers, namely the public. This means we must have public liability insurance, our boilers must meet an approved standard and we must generally comply to a high level of safety standards. Under these circumstances the two AALS Codes and the Boiler Code provide us with all the rules we need for a safe and trouble free operation. Every eventuality is covered.

To go down the path of further rules and regulations, we run the risk of driving people away from the hobby or stifling their enthusiasm. Many people will tend to quietly drift away from the club scene. They are the ones who joined because they love building or operating their models — put simply, they believe it to be a hobby to enjoy and treat as fun. Is it a coincidence that some of the largest clubs have the least number of rules? To regulate further is really to try and regulate commonsense and to try to eliminate any decision making by the individual. Aren't hobbies for leisure and recreation — a time to relax and unwind, a time to enjoy oneself? Well that's why I build trains anyway. How about you?

David Proctor

Join us in a great hobby!

If this is your first issue of *Australian Model Engineering*, welcome!

In successive issues we cover many topics centred on that wonderful process of model engineering — alias *tinkering*.

If you're new to model engineering as well as our magazine, you'll benefit from getting together with other model engineers — we're good at sharing ideas and saving each other money! If you don't have any contacts, start by looking in Club Roundup to find a club that's near to you. Many of our readers have discovered people with similar interests literally just around the corner.

Helping other model engineers is the simple idea of the volunteers behind this magazine. Our readers write items for us — for the same (non-existent) rate of pay! If you have ideas, opinions or techniques that you feel would be interesting to others (especially from the newcomer's angle), please drop us a line. We can send you a useful guide and help with preparing artwork or editing.

I hope you'll enjoy the great fellowship that makes our hobby special, and that you'll support our advertisers — after all, they help pay our bills!

David Proctor
Managing Editor



Ramah Machines, Building a Metal Disintegrator by Benjamin Fleming

Metal Disintegrator

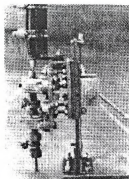
by Ramah Machines

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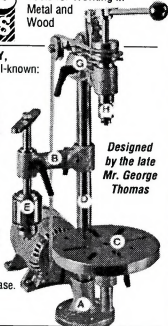
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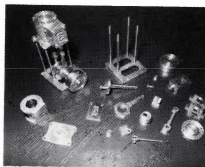
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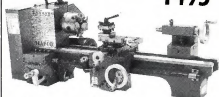
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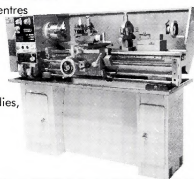
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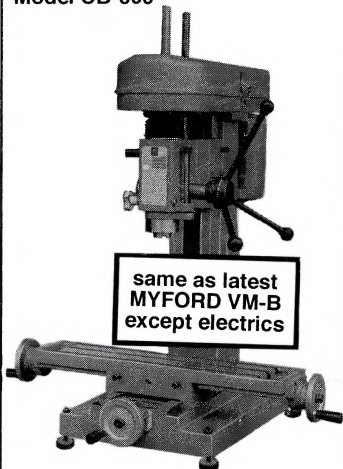
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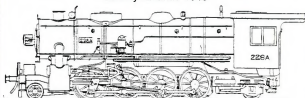
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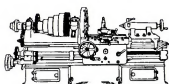


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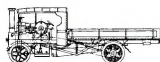
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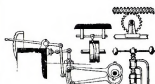


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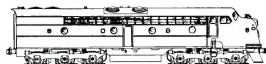
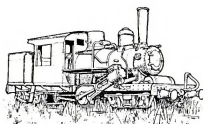
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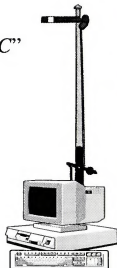
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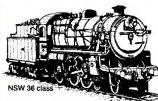
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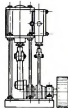
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Sydney Live Steam Locomotive Society



50th Anniversary



by Warwick Allison

The continuous existence of any organisation for a period of 50 years is a notable event. The Sydney Live Steam Locomotive Society was one of the first model engineering societies in Australia which focused on miniature railway live steam.

By the 1920's descriptions were appearing in the *Model Engineer* of 2 inch gauge engines hauling living passengers on elevated tracks. In the 1930's there was a growth in England of miniature locomotive construc-

up and clearing was necessary.

The terrain was extremely rough but we were fortunate in receiving several hundred tons of filling from the widening of the railway cutting at West Ryde, donated by the NSW Government Railway. This enabled production of a reasonable surface at the top end of the ground. The track was next

erected, 400ft of 2" and 3" gauge elevated using brass rail. The grounds were officially

opened by the Mayor of Ryde, Alderman K Anderson on 22 October 1949 and the track officially opened by Mr. Garside, Commissioner of the New South Wales Government Railway that afternoon.

Our original toilets consisted of two hessian enclosures. Unfortunately the "mens" was burnt to the ground within a fortnight although the "womens" survived.

RYDE-PARRAMATTA CRIPPLED AND SPASTIC CHILDREN

THE SYDNEY LIVE STEAM LOCOMOTIVE SOCIETY

has pleasure in presenting a

Miniature Steam Locomotive Display

at

Darvall Park, Park Avenue, West Ryde

(off Chatham Road), on

Saturday, 16th March, 1957

2-15 to 5-30 — 7-30 to 10 p.m.

Admission 2/- Children 6d, payable at gate

C. S. MACKELLAR, Hon. Secretary

Invitation for a charity day in 1957. Note the times!

The first Charity Day was held the year following our opening. It went from 2.00pm to 10.00pm. Our only lighting was a couple of Tilley lamps and two or three hurricane lamps tied to posts. Imagine the consternation when a derailment occurred at night and tore up several feet of track. Undaunted the members set out to and repaired the track in quick time and running continued.

Our first 5" gauge track was a 360ft oval laid inside the 400ft elevated track. This track was officially opened in October 1952 by the



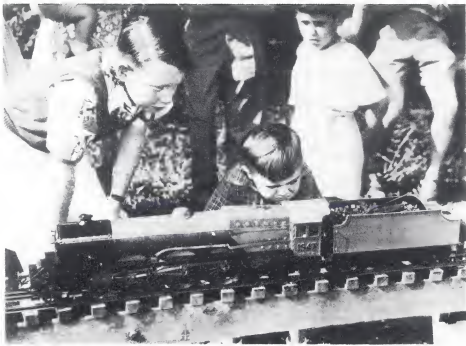
The official "last spike" on the completion of the 925 ft track on 17 April 1954. Those present were (left to right): Bob Cade, Richard Bowman (part. visible), Brian Hurst, John Ellison, Cec Mackellar (drilling for spike), John Hurst, Cec Gunning and George Floyd.

tion, principally fostered by articles written in *Model Engineer* by 'LBSC' and others, which whet the appetites of our founders.

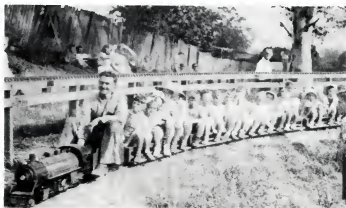
Cec Mackellar had built a track around his house in Rhodes NSW where those interested used to meet of a Saturday afternoon and enjoy the running of locos during afternoon tea and scones. This group was known by 'LBSC' himself unofficially as the Rhodes Live Steamers during the 1930's and early 40's and was the start of what was to be the Sydney Live Steam Locomotive Society.

The group still operated through the war years, though at a somewhat slower pace. It was during the early 1940's that John Ellison Hurst considered that it would be proper to obtain a new site and formally establish a new club specifically for the operation of miniature steam locomotives. The first formal meeting of the Society was held in the offices of John Ellison Hurst in Martin Place on 13 July 1948. At this meeting Cec Gunning was elected President, Cec Mackellar was Secretary and the Treasurer was John Hurst (junior).

The grounds were originally nothing more than a rubbish dump so considerable cleaning



The Hurst's Princess 4-6-2 shows the ever-present interest that steam engines hold for the young (and not so young). Interesting to think that these boys are quite likely grandfathers by now! The engine, finished in 1947 was big for its time — and 2½" gauge at that!



Big trains have always been a feature of West Ryde. Here Ted Herbert's 2-8-2 handles a good load of young passengers in this early 1950's scene. Photo: J Hurst Collection



Cec Gunning with Coronation (still a Pacific here) giving rides to crippled children. SLSSL has long supported children's charities, principally Crowle Home at Ryde. Photo: J Hurst collection

Mayor of Ryde Alderman H Mitchell on a Charity Day for Legacy.

A new elevated track was commenced with a length of 925ft for 2" and 3" gauges. This track was opened by Mr Armstrong, Chief Mechanical Engineer of the NSWGR in May 1954.

Fires were a constant threat for some years due to our lack of an efficient water service, as well as the dense growth which covered quite an area of the grounds. At one stage one of the members who had access to quantities of old sump oil thought a solution to these fires might be to spray all around the track to kill off the grass. The end result of this exercise was that on the next running day ash out of one of the locomotives set the oiled grass alight and we had the worst grass fire in our history!

Easter 1956 saw the first Convention held at our grounds. This was the start of the conventions in Australia, and representatives attended from Victoria and South Australia.

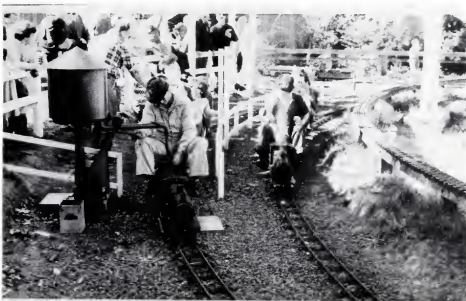
Looking for further expansion of our facilities, application was made to Ryde Council to extend our southern boundary. This was granted, the extension enabling the elevated track to be increased in length to 1320ft. This was completed in time for the 1959 convention. Subsequently this allowed a programme of expansion of the ground level track and this formed the basis of our present 5" gauge operation.

In July 1965 one of our co-founders Mr J E Hurst died. Eight months later our other co-founder Mr C S Mackellar suffered a serious illness from which he never recovered. This closed a 17 year period in our history, an era in which our Society's foundations were well and truly laid. Over this period the guidance given the Society by our co-founders, ably supported by the President Mr Cec Gunning could never be fully realised, although it has been fully appreciated, I am sure. In 1973 Cec Gunning, retired from office after holding the position of President for 25 years.

Australian Miniature Boiler Safety Committee

The Boiler Code as applied to "live steam locos" was initiated by our Society and subsequently adopted by all societies in Australia, effective from 1st May 1968 and has been recognised around the world where "live steam" operates. It was realised that such a code would need to apply on an Australian basis, therefore opportunity was taken on interstate visits to discuss the matter with members of Live Steam Locomotive and Model Engineering Societies in Adelaide, Hobart and Melbourne. Discussion with Society members within NSW also occurred. Eventually the matter of the introduction of a Boiler Code was entered for the 1966 10th Annual Live Steam Convention Agenda, held at the SLSSL at West Ryde, NSW. This meeting accepted the need for a Boiler Code on a Commonwealth basis, and recommended that a committee representative of NSW Live Steam Societies and Model Engineering Societies be formed to prepare such a code. Mr Cec Gunning was elected Chairman while Mr S L N Childs M.S.Mech.E (Aust) Consulting Engineer for Boiler and Pressure Vessels, was co-opted at the second committee meeting, and became a member of the SLSSL later on. Mr R.V.Wood was appointed as Secretary at the first Code Committee meeting, and carried out his duties in a very satisfactory manner. Reg also provided printing facilities, which were greatly appreciated. Reg subsequently received a *Live Steam* Magazine Award for his efforts.

At the 1967 convention at South Australian Society of Model and Experimental Engineers in Adelaide, approximately seventy members of all states attended. The Draft Code was reviewed and additional information from this meeting was received and incorporated in the Code. The AMBSC Code-Part 1 was issued at the 1968 Annual Live Steam Convention, Moorabbin, Victoria, and was accepted as a splendid committee effort. The SLSSL involvement continued with Jim Hyde replacing Cec as Chairman on his retirement.



The ground level station on 17 September, 1966. Jim Ranford's Netta is taking water while Ray Lee and 3290 pass on the main line. Bill Richards is collecting tickets and John Hurst's 4-8-2 is in the background. Photo: G Kirkby

Wheel and track standards

The coarse wheel standard adopted by the Sydney Live Steam Locomotive Society and others was originally evolved by Ted Herbert and first committed to paper by Bill Richards on the 1 March 1959. Ted operated a private railway at Luddenham, NSW which was probably the first 5" gauge ground level railway to use points. Flange width and depth was specified. The width of the wheel was also considered in regard to oil being deposited on the track and was arranged so that the wheel face did not come over the rail head.

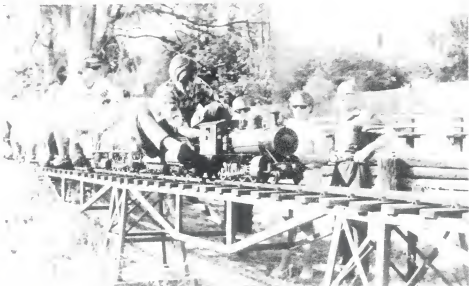
At the 1975 Easter convention at Edgeworth, wheel standards received a lot of attention. While at that stage it was not named as a national standard, it was strongly recommended for use for passenger carrying trucks. Ultimately it was published as the coarse wheel standard in the AALS Code of Practice and its use has been proven over the years.

Our scale

The Society also recommended the building of 5 inch gauge miniature locomotives of standard gauge prototypes to a scale of $1\frac{1}{8}$ " to the foot ($\frac{3}{32}$ " to the inch). This was pioneered by Bill Richards and is a much more convenient scale to work to than the traditional $1\frac{1}{16}$ " to the foot, and produces a slightly larger locomotive. A major benefit is the additional clearance that it gives between the leading driver coupling rod and the rear of the crosshead and in the additional bearing area on the connecting rod crankpin.

The Australian Association of Live Steamers

At the 1975 Easter Convention at Edgeworth, our member Reg Wood put forward a motion to constitute a national association. The motion was adopted and ultimately it was decided to call the new organisation the Aus-



The ground level track crossed a gully by this bridge, relocated from Ted Herbert's railway at Luddenham. In this 17 October 1970 scene, the lead engine is a NSW 2-8-0 'J' Class built by Barry Tulloch, driven by Peter Dunne. Barry is driving Keith Gape's 57 class. Photo: G Kirkby

tralian Association of Live Steamers. Ken Tinkler (Steam Locomotive Society of Victoria) was appointed Secretary to setup and guide the fledgling group. In 1981 the first constitution was published for discussion. It was considered important enough for every member to receive a copy. Following discussion the Society decided not to support the proposed document. It was felt that some of the wording was intended to imply a level of control over societies and interference with the AMBSC, a group that at this stage still had a Chairman and Technical advisor from our Society. In 1992, thoughts were given to reassessing AALS affiliation. There was a need to foster better interclub relations and the AALS itself had evolved and matured. There was also the need to address changing regulatory

requirements and the benefits a united body would have in this major issue. Clearly, if we wanted changes to AALS to address some of our remaining concerns, it could not be achieved from outside the organisation. Following some wide ranging discussion a society wide postal vote in December 1993 approved our re-entry which was granted by AALS in February 1994.

Since then the Society has been active in the deliberations of this body as well as AMBSC. We have recommended changes to the Codes of Practice and were deeply involved in the new constitution which was drawn up to overcome administrative difficulties within AMBSC and process improvements to the AALS operations. We were encouraged when a postal vote of the changes accepted virtually all of the SLSLS proposals and together with proposals from other Society's created a new integrated constitution covering the total sphere of live steam operations in late 1996.

Interclub visits

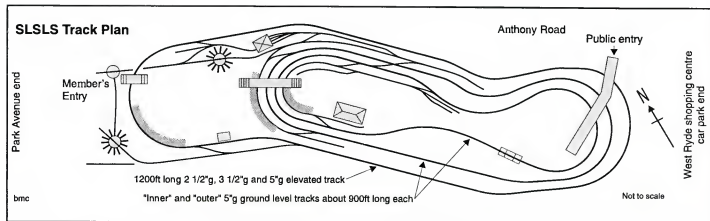
The Society also introduced the "inter club meets" amongst the clubs of NSW. At a meeting held at our grounds in 1973 newly elected President Bill Richards suggested the idea of interclub visits. This has been very successful, although with the creation of other clubs and the development of clubs holding their own birthday invitations, by the 1990's attendances had dropped off. Clearly the maturity of the movement has meant that the visits had served their purpose.

Development of the facilities

In 1970 work started on building the carriage shed, and the original elevated track was now getting in the way of the crowds. This track which was an oval in the middle of the grounds, was seeing less use. In 1971 it was reduced in length to about 250ft and relocated to give better movement through the grounds for the public. This track retained $2\frac{1}{2}$ " and



A view from the 'high girders' (as Cec Gunning called them). Despite tales of locos and drivers vanishing off the track, there seems not to have been any disasters with passengers, that on $3\frac{1}{2}$ " gauge! The construction of the elevated track can be clearly seen. Photo: SLS Archives



The SLSLS track plan as at July, 1998

Drawn by Brian Carter

3 1/2" gauge using brass rail right to the end. It was finally removed in 1980 after being unused for some time, as access around it was more difficult due to the duplication of the ground level track. This was the last remnant of the original railway with the brass rail which had over time been found to be not really suitable for the purpose.

Following Bill Richards' election as President in 1973 the immediate project was the reconstruction of the elevated track. The original track was now more like riding a ship at sea as many posts had sunk, and the timber needed replacement. In the event all pitched in but it was not until 1976 that work was completed, just in time for the final convention to be held at West Ryde. The new track was of concrete beam and post construction and an all welded track with timber sleepers to soften the ride. It featured swing beam style stub points to permit trains, complete with footboards to move from the loco siding to and from the main line. A very impressive arrangement and of substantial construction. It was Cec's dream that these swing points be operated from proper levers and this has finally been achieved. Cec would have been proud to see the realisation of his vision.

A co-operative

Thoughts were also being given to incorporation as some protection against litigation, a constant threat in the back of everyone's mind. A co-operative was considered the appropriate course, and a small group was formed to make the necessary arrangements. At the end of 1976, the details had been completed and following general acceptance by members on the 15 February 1977, the new Sydney Live Steam Locomotive Society Co-op Ltd came into being on the 1 May 1977.

Over the years many improvements have been made to both elevated and ground level riding cars. Our elevated cars were fully enclosed and as time progressed they gained vacuum brakes, and grab handles. Recently the grab handles were removed and solid end boards fitted with new buffers and drawgear. In 1998 an anti tip rail is now well in hand to limit the carriage tip when passengers lean over. The completion of new ground level

cars in 1983, to an evolved design by Ray Lee, gave the society a long term trouble free fleet (with brakes). The cars had toe guards, but it was not until 1997 that full end boards were fitted with a single buffer, together with some additional ballast weights to improve stability.

Major projects.

1978 saw a physical start made on some long talked about projects. These included the ground level railway signal box, which was built on top of the carriage shed, duplication of the ground level track, and the eastern retaining wall, a long concrete construction, which was built using standard form work and a small purpose built derrick crane to lift the concrete into position. A concrete ballast pit was also in hand. By early 1979 the newly completed double track ground level railway was in full operation.

Weldmesh style station fencing had been introduced and has been extended to provide crowd control. Over the years this has become more and more necessary, but the building of proper entry and exit races has made operations very orderly. More recently, post and wire fencing has been provided along all tracks. The construction in 1981 of our club house finally provided our own meeting room and proper facilities for the ladies to supply our visitors with refreshments. We are always grateful for the invaluable help and support which the ladies provide and it has been pleasing to be able to upgrade the kiosk with a proper drinks refrigerator and freezer for the ice creams.

Three major bridges have also been built. These include a Hawkesbury River style span to replace a rather open 3-span truss inherited from Ted Herbert's original railway at Luddenham. A long 3-span ramped entry bridge over both ground level and elevated tracks was built to facilitate public entry, and recently a new steel structure has replaced our original timber bridge at the ground level station. As well the ground level railway signal box, fully functional with quarter scale colour light signals and motor operated points operated from a Westinghouse style miniature lever frame, was completed.

The area near the big gum trees in the middle of the grounds was a big hole for many years. Over time, this proved to be a useful place to dump the spoil from the various projects which involved digging (and what doesn't!) that the Society embarked on over the years. By 1992 the hole had become a hill separating the two ground level tracks. This hill was planted with over 50 native shrubs and some trees (to replace the gum trees which became full of borer) and is now a feature of the grounds with the beautiful native flowers and foliage.

The Society in the community

The Society has had a long history in the support of charities. Originally a condition of the lease, the Society's policy has been to support children in need and this has done consistently over the years. At least one charity day was held every year, seventy six over our 50 years, and in some cases there were three in a year!

The Society has been blessed with dedicated office bearers. Over our 50 years there has been only 5 Presidents, 7 Secretary's, and only 1 Treasurer! It is a credit to the financial management of our Treasurer John Hurst that we have grown the way we have. To have had only one Treasurer in its 50 years existence is a most remarkable record and one which the Society is proud. Similarly John Lyons has been Newsletter Editor for 22 years.

While the Society's grounds are not the largest, nor the tracks the longest, we really operate 3 separate railways in pleasant park like grounds. The comprehensive facilities provided by the ground level railway Signal Box, have allowed the operation of 6 car trains, double or triple headed where necessary, to give an intensive passenger service, which can move 3000 passengers in an afternoon's running. There is a high proportion of members who would be considered active, which contributes to the successful operation of the Society.

Members of the Society are proud of its achievements. In many ways, our history is synonymous with the history of the live steam movement. We hope this continues.



SLSLS Anniversary Weekend Celebrations held at West Ryde on the 21-22 March 1998.



by Warwick Allison

Saturday 21 March 1998

This was the usual public running day, except that gates were open from 10am. A special display of historic live steam and model engineering was held in the clubhouse. Models on display included 2½" gauge locos of yesteryear. 'LBSC' *Olympiad* and *Dyak*, and a 4-6-2 four cylinder Princess were early passenger haulers for the Society. A 2½" gauge 36 class completed the smallest gauge. There was a 3½" gauge 'King', *Mona*, *Tich*, *Lion*, 36 class, P Class and *Brittania*. In 5" — part built locos included a 1½" scale Shay, South Australian 500 class, *Brittania*, *Sweet Pea* and a Baldwin 2-6-0. A finely detailed 55 (K) class, 0-4-2 Ajax, and a well detailed 50 class tender completed the loco display. A 3" scale Foden steam wagon occupied the centre of the room. There were goods trains and a variety

of locos to see running as well as our usual heavy passenger hauling. Spectacular train operation with double headed Pacifics on 6 cars on the inner main, and 59 plus 30T combination on the outer main were just some of the highlights. Running went on well into the evening, after the BBQ.

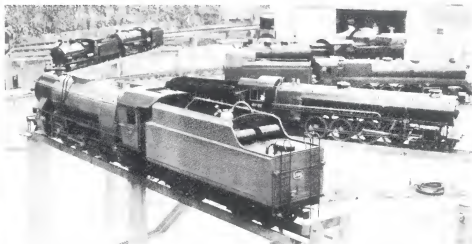
Sunday 22 March 1998

Sunday was the day that members of other clubs came to run and



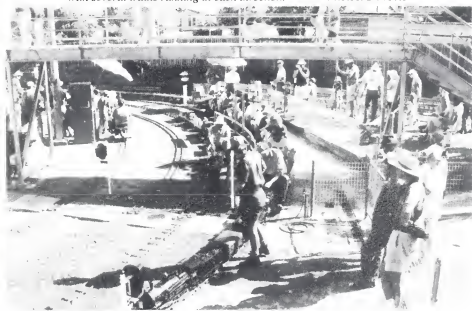
Warwick Allison's WAGR 'V' class nears the signal box with a typical load. Photo: D P

share the celebrations with us. Visitors came from as far afield as South Australia, Victoria, Canberra and Newcastle with their locos. The hot conditions kept the numbers to around 120. Around the middle of the day, track operations came to a temporary halt for the official proceedings. The SLSLS President,



Part of the line up in the steaming bays (above), and some of the activity in the station area, as seen from up in the signal box (below). The signal box affords an excellent view of the track, making it an easy matter to control the traffic flow with several trains running in each direction.

Photos: D Proctor



Ross Bishop-Wear's Toneya was kept busy all afternoon. Photo: D Proctor

Warwick Allison spoke of the Society's past association with council, and this was responded to by the Mayor of Ryde, Councillor Peter Graham, who went on to describe the invaluable contribution the club has made to the local community. Barry Glover, President of the Australian Association of Live Steamers spoke of the significant achievements of the Society, both in its own operation and as a contribution to the hobby as a whole. After a great lunch it was back onto the track again, or simply a case of sitting in the shade and enjoying the company of others.

A Very Simple Milling Machine Vice

by Ron Miles

drawings for publication by Rex Svensen

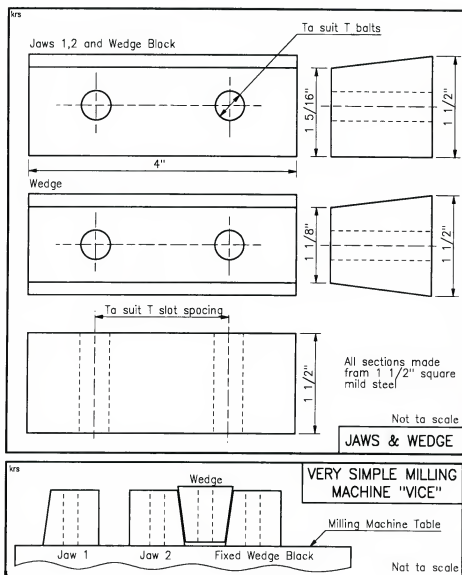
This "vice" will be equally at home on any milling machine. The jaws are locked in position by a wedge instead of a screw, thus simplifying construction and use.

In use, jaw 1 is set up at right angles to the table and locked in position by two 'T' bolts. The part to be held is placed against jaw 1 and jaw 2 is then butted up against it and the 'T' bolts are finger tightened.

The wedge is then placed against jaw 2 loosely, heaping the base at least $\frac{1}{16}$ " off the table, whilst the wedge block is locked into position against it. Now lock the wedge down and jaw 2 will tighten against the object in the jaws. Tighten jaw 2. A smear of oil on the wedge faces will make it all a bit smoother.

Construction is pretty simple and straight forward. The taper can be put on in one operation and then sawed in four pieces. The wedge will then need to be tapered on the other side. Face off the ends and drill the holes for the 'T' bolts.

On completion you will have a "vice" whose capacity is limited only by the length of your milling table. It's a lot cheaper than a machine vice, has a greater capacity and sits lower on the table. As an additional bonus, special jaws can be made to hold those difficult bits. For instance, two vee blocks placed between jaws 1 and 2 can be used to hold shafts horizontally or vertically.



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A Triple Expansion Marine Engine

Story and photos by Bert DeJong

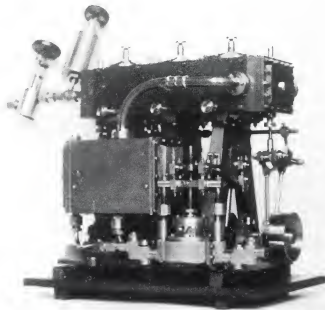
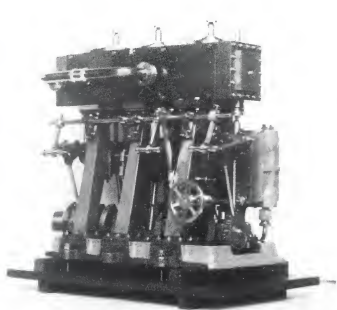
These two photos show my triple expansion marine engine which took two years of spare time to build.

The design is by O. Burnaby Bolton (circa 1920). The cylinder bores are $\frac{3}{4}$ ", $1\frac{1}{4}$ " and $1\frac{3}{4}$ " x 1" stroke. The crankshaft is 10" long, $7\frac{1}{2}$ " high and 5" wide, weighing about 28 lb — made of gunmetal throughout. The engine

has a vacuum pump, a boiler feed pump and a circulation pump for cooling water to the condenser.

The model is of the engine from the ss *Kuttabul*. The story goes that it was a ferry, converted to a naval base-ship in the last war and she was moored in Sydney Harbour during the war. On one occasion, a US aircraft

carrier, *Chicago* was moored nearby, when during a night-time raid a Japanese midget submarine entered the harbour and apparently fired a torpedo at it. The torpedo missed the carrier and hit the *Kuttabul* instead, sinking her with 22 Australian marines on board.



Safety Warning! Viton Rubber Products

The following information originates from the Ministry of Defence in the UK.

"An incident has recently come to our attention in which a man had a finger badly burned while handling a Viton 'O' ring which had been exposed to high temperature. The burn was the result of chemical contamination of the skin caused by the decomposition of the Viton. It was necessary to amputate part of the finger to remove the contamination.

Viton is a fluorelastomer, ie. it is a synthetic rubber-like material containing fluorine. It is commonly used for gaskets, 'O' rings and seals of various kinds. Although Viton is the more well known fluorelastomer, there are others including those using trade

names flourel and tecnoflon. When under their design conditions, they are perfectly satisfactory and safe. However, if exposed to a temperature of 400 deg. C or higher, the material does not burn, but decomposes, and one of the products formed is hydrofluoric acid. This acid is extremely corrosive and is almost impossible to remove once it contaminates the skin.

If it is required to inspect equipment which has been exposed to a very high temperature (eg. a fire), look closely to see if there are any gaskets or seals which have suffered from decomposition, in which case they will appear charred or as a black sticky mess. If this is the case, do not touch either the seal or the equipment. Enquiries should be made

to see if fluorelastomer seals have been used (if natural rubber or nitrile seals, there is no hazard).

If fluorelastomer seals have been used, the affected area should be decontaminated. Do not touch anything in the vicinity of the decomposed material until it has been cleared."

Viton 'O' rings have found fairly widespread use in model engineering. The critical temperatures can easily be reached in models like a Stirling engine or any number of high temperature experimental models.

(Courtesy of Merv Steadman)

Steam Chest



with Dave Harper

Hi there, steam fans, and welcome to another load of steaming stuff, or something.

In response to my plea for more photos of model stationary steam engines in the March/April 98 Steam Chest, Arnold Thuys of South Australia kindly responded with some excellent photos of the projects he is currently working on, with the promise of more to come!

The twin cylinder vertical marine engine (photo 1) has fabricated cylinders of 12mm

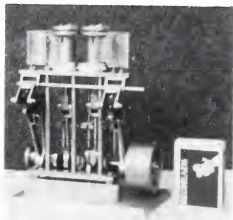


Photo 1

bore and is awaiting completion of the valve eccentrics and linkages. As Arnold says, it's not quite as tiny as Dave Sampson's miniatures but is quite small enough for his eyesight!

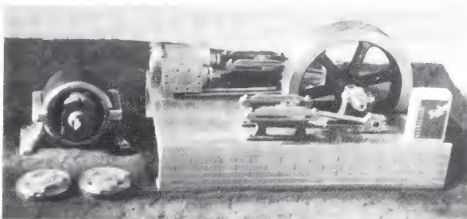


Photo 2

The horizontal compound engine is intended to drive a 3-phase generator giving 6 volts. The fabricated frame is intended to look like a casting. The generator will be rope driven from the engine flywheel. Only the LP cylinder is fitted in photo 2.

The design is adapted from an original drawing from Delft University in Holland which dates from 1915, when his father studied there. The full-size engine was a 150hp compound of 700mm stroke, 70 revs/min at 7kg/sq mm. Arnold has promised me a copy of the original drawing in due course.

The model's cylinder was machined from solid 55mm dia. gunmetal and has a bore of 25mm. Arnold prefers to do a little extra machining rather than mess about with one-off castings. The connecting rods are fish-belly shaped and look better than the flat bar type, he reckons.

The crosshead guides were silver soldered up from 4mm steel plate and then milled to size. The 140mm dia. flywheel was machined from a piece of 25mm steel plate.

Apparently Arnold was working on both these models when he saw the Benson engine on the cover of the Sept/Oct 97 AME. This sent him in search of the original ME articles, and resulted in the model in photo 3. The cylinder, flywheel and entablature are all fabricated; the shaping around the baseplate was done with a small home-made silver steel

router cutter in the milling machine, very slowly!

In the foreground of the photo is the 48 DP hob made from 17mm silver steel which will be used to cut the two helical gears for the governor drive. Arnold plans to cut the gears on the mill as he has a direct drive from the main spindle to the gearbox to the rotary table. If it works, there are bigger hobs on the drawing board!

Arnold has also produced a very neat water tube boiler (photo 4) which has a capacity of 0.95 litres, has 900 sq cm heating surface and is propane fired. We're waiting on a copy of the drawings, Arnold!

This is the sort of stuff we love to get from readers, and Arnold has promised some articles on some of his other projects in due

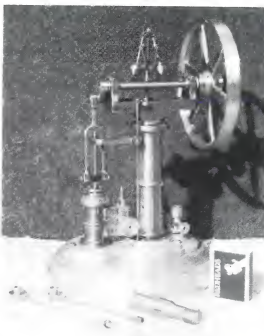


Photo 3

course. Thanks very much, Arnold, keep up the good work!

He has a suggestion too; does anyone know how to make a small spark-eroder? Accidents with small taps do happen and it would make a good article for AME.

More from Dave Sampson

I finally got around to photographing Dave Sampson's latest setup over Easter, at the Boiler House. Each steaming day, Dave brings along a board with the four models mounted as shown in photo 5, as well as sundry other models, like the little twin at front left of the photo.

These are connected to the compressed air manifold we have set up. This was made from a length of 100mm x 50mm RHS of about 3mm wall thickness. End plates were welded on, which also serve as feet. Four outlets were provided with stop-cocks and provision for fitting flexible hoses. This enables us to quickly change the models around as neces-

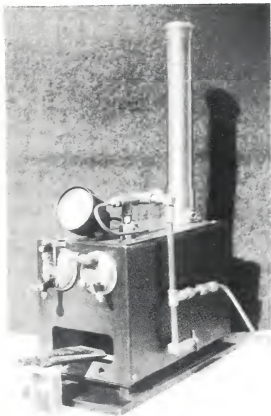


Photo 4

sary. On the inlet side is a pressure regulator set to about 30 psi and a pressure gauge and drain plug complete the unit. A flexible line connected to our compressor enables us to run any models that are available, and generates considerable interest among our visitors.

To return to Dave's models — I gave my macro lens a good workout when we took the models outside in search of some decent light, and **photo 6** shows the result. This is Dave's latest model, a tiny Worthington pump which is about 3" long and is complete except for the screw that I just noticed missing on the left of the baseplate! Like Arnold Thuys, Dave doesn't use castings, and all the components will have been made using his old Myford

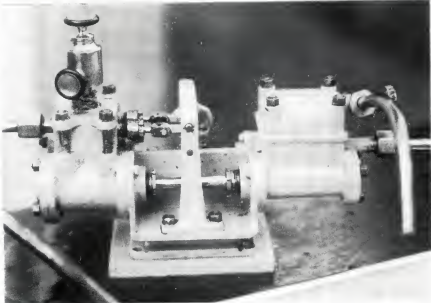


Photo 6

3½" lathe and a hand powered shaper! Much hand working is involved to achieve remarkably accurate models. Each pump has its own air inlet from his sub-manifold, plus a filter on the water intake and an outlet which returns it's water to the stainless steel tray as shown in photo 5.

Photo 7 shows the Weir pump which has the shuttle valve featured in the Nov/Dec 97 AME, and which works so slowly that you have to stop and watch it for a while to make sure it really is working!

Photo 8 is the tiny Scotch yoke pump that will almost fit into a matchbox, and **photo 9** is the duplex marine engine complete with crosshead driven feed pump and, from memory, Marshall valve gear.

Notes from the Notched Ingot

The little Worthington pump reminded me of a snippet in the Nov 1961 issue of *Hoyt Notched Ingot*, house magazine of Hoyt Metal Company of Great Britain Ltd. which I

wrote about in last issue's Steam Chest.

The item is headed *Steam Pumps in Western Australia* and is a letter from a Mr N. D. Miller at No 7 Pumping Station of the Goldfields Water Supply in WA which gives an interesting outline of the system of pumping plants in operation at that time:

"Originally there were eight steam stations, but now stations 1,3 and 4 are electrically operated; No 2 was closed permanently. The

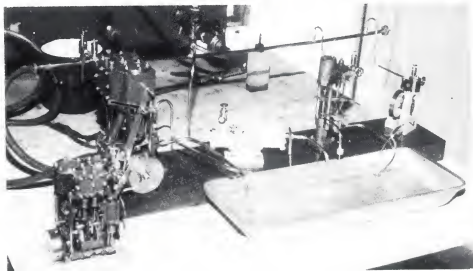


Photo 5

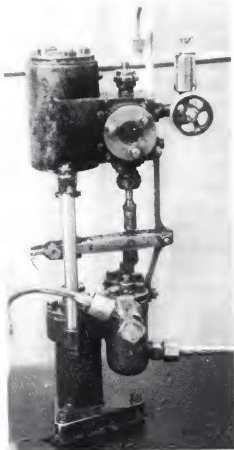


Photo 7

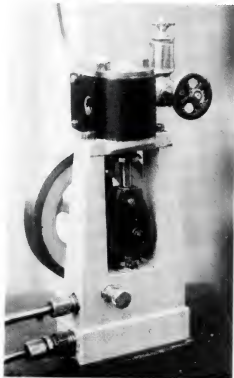


Photo 8

steam plants in stations 5,6,7 and 8 are originally built.

The engines in these last four stations can be described as two sets of horizontal twin, three cylinder in tandem triple expansion high duty pumping engines, built in 1900 by James Simpson & Co. of London and Newark-on-Trent using Worthington's patent high-duty system.

The cylinders are: HP 16" bore, IP 25" and LP 46" with a nominal stroke of 36". With a steam pressure of 175 psi and 24" vacuum the engines run at 23 strokes per minute and

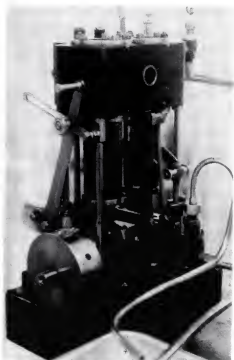


Photo 9

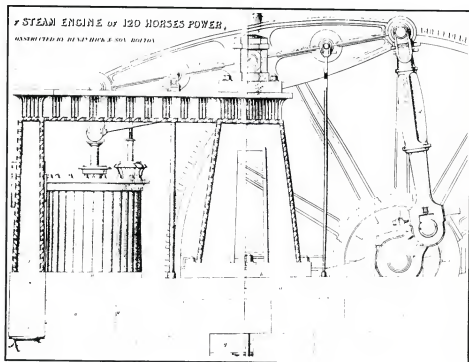


Figure 1

pump 5 million gallons in 24 hours. Only one set of engines run at any one time, the other set being on standby. Operating head by gauge is 240ft.

The two boilers at each station are Babcock and Wilcox water-tube W.I.F. type with a single steam and water drum 4ft dia and 24ft 3ins long and 81 water tubes 4in dia. All the boilers are wood-fired, burning 6ft logs under natural draught".

It's quite remarkable that these units were still going after 60 years, I wonder how far they had to bring the firewood from? These units are clearly gigantic versions of the Worthington pumps that we now use as feed pumps. It's not widely known that the principle of the Worthington duplex pump was first developed for large volume water pumping, and huge pumps of this type were produced from about 1880 to the early 1900s.

This item raises a number of questions—are any of these pumps still in existence? Where was the Goldfields Water Supply? Does anyone have any details of the development of the Worthington pumps? What's a Babcock & Wilcox W.I.F. type boiler? Can anyone out there help us?

Another old beam engine

Here's another example (Figure 1) from the remarkable book on Textile Mill Engines by George Watkins, reviewed a couple of issues ago. When Marshalls needed more power for their flax spinning mill at Holbeck, Leeds in 1840, they decided on a remarkable single story building designed with an Egyptian motif for the exterior, and this was carried through to the engine framing and governor.

Made by Benjamin Hick and Sons of Bolton, it had their characteristic short stroke, six

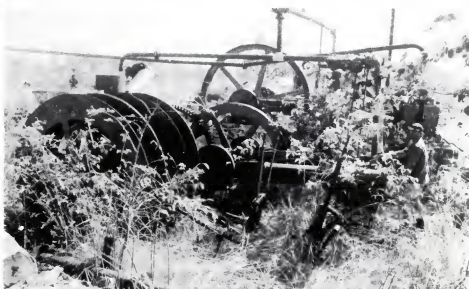


Photo 10

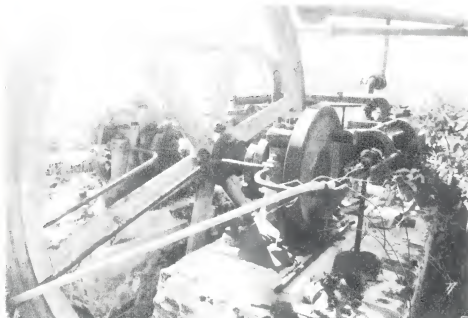


Photo 11

columns supporting a massive entablature, and the very short cruciform centre section for the connecting rod. The slide-valve cylinders were 54in bore x 5ft stroke, with cranks coupled at right angles, and like the mill there was only a single story in the engine room.

The engine developed 240hp at 19 revs/min with 15 psi steam. Drive was by teeth on the rim of the 27ft dia. flywheel to the mainshaft below the mill floor. All was scrapped when the mill was closed in 1884.

Travels with Kenny

Last issue we had just reached the Tyrconnell gold mine and were being shown around by Cate and Andrew Hicks. These remarkable youngsters were living in really primitive conditions while they set about clearing up the site with a view to opening it to tourists.

Photo 10 shows Andrew amongst the undergrowth which is covering the old winding engine and air compressor. They sure have some clearing up to do!

Photo 11 shows the Thompson cross compound air compressor. Like most of this style of compressor, the air pumps were driven

from the steam piston tail rods. The compressed air was used to operate rock drills etc.

The Tyrconnell is one of the most complete mines left on the Hodgkinson river field as it was worked right up to the mid 1970s. One of the most remarkable features of these old mines is the boilers which had to be hauled over three mountain ranges from the coast, by horse or bullock teams! They were apparently rolled up and down the steepest grades, but they must have required huge efforts no matter how they were moved. **Photo 12** shows the three boilers at Tyrconnell, two old Cornish and one under-fired Colonial. All are linked to a common steam main and without lagging the engines must have been running on hot water in the winter!

There were many strange bits of gear lying about the mine head and **photos 13 and 14** show a couple of these. If anyone can shed some light on their use we'd love to hear from you!

That seems plenty for this time, till next issue, happy steaming!



Photo 12



Photo 13



Photo 14

Slip Eccentric Valve Reverse Mechanism

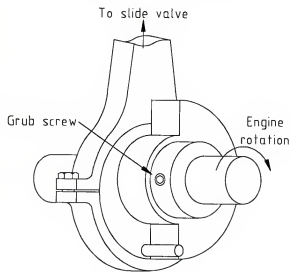
by Graham Shanks

Drawings for publication by Jim Gray

On page 30 in AME (Jan-Feb 1998), I made mention of a slip eccentric reverse mechanism used on my twin cylinder No. 5 open launch engine. In response to the enquiries

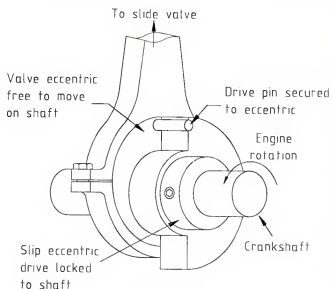
that have resulted from this article, I have drawn up the following drawings. They are fully explanatory and probably need no further comment, other than to mention that

drawings 1 and 2 show the engine rotating in opposite directions and the valve eccentric positions approximately 180° apart.



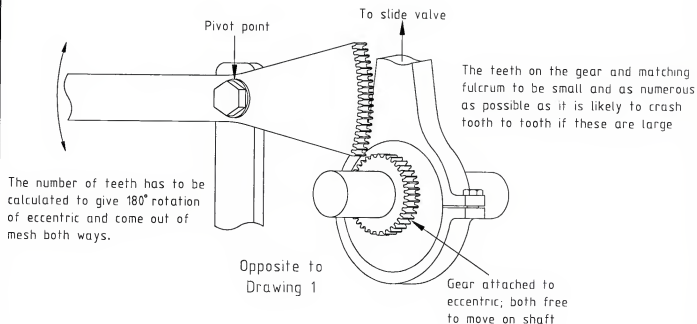
Drawing 1

Not to scale



Drawing 2

Not to scale



Drawing 3

Not to scale

A Tip For Lubricator Construction

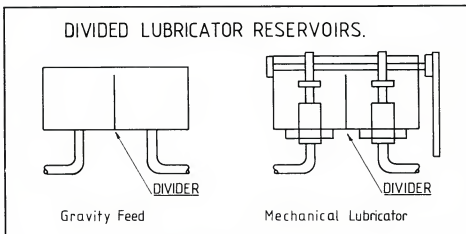
by Keith Hartley

Drawing for publication by Peter Hall

Having seen and heard much discussion regarding the pros and cons of different types of lubricators, there is one fault which is evident with some mechanical or gravity feed units. The fault applies when two or more lubricator pumps or gravity feed lines are contained in one reservoir with an unknown rate of feed, or none at all, to the various feed lines

The solution is that dividers must be placed in the reservoir to create an individual reservoir for each feed pipe as shown.

I encountered this problem when servicing early escalators, manufactured by Johns & Waygood Ltd in the 1960's, and was reminded of this fault recently when shown a commercially made mechanical lubricator for 7¼" gauge which contained two pumps in the one reservoir.



Building a NZR 'Fa' Locomotive in 7¼" Gauge

By Dave Fitton

Drawing and photos by Murray Lane unless otherwise credited

Fa 9 was chosen as a prototype to model as she had the flat bar cow catcher, kerosene headlamp, coffee pot style sand dome and a tall funnel to finish off. Fa 9 was first built at the NZR Addington (Christchurch) workshops in 1876 as an F class 0-6-0 saddle tank locomotive, and was rebuilt in the same shops as an 0-6-2 side tank locomotive in 1897 and reclassified as Fa. Fa 9 worked the Westport section (South Island West Coast), from Deniston with 350 ton coal trains.

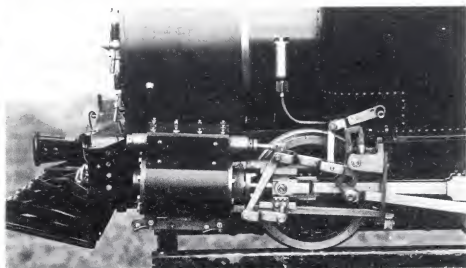
Collection of materials started in 1985 with a view to building this locomotive in retirement, which did not eventuate until 1992. Drawings of the frames and springing (there were two types), GA drawing, motion work, cylinders, wheels and boiler were obtained from the NZR Chief Mechanical Engineers office in Wellington.

The frames were made from 100 mm x 6 mm black steel which was ground to ⅜" thick. A decision was made to stick to impe-

rial measurements for the frames. Frame stretchers were made from 100 mm x 60 mm black steel and were trued in the four jaw chuck. Drag beams were cut to size and angle plates riveted on and bolted to the frame assembly. Horns were built up from angle steel, cut and bent around the axle bearing blocks, corners were welded in and built up to a finished horn assembly. (an easy way to manufacture and no milling involved — it also looks the part).

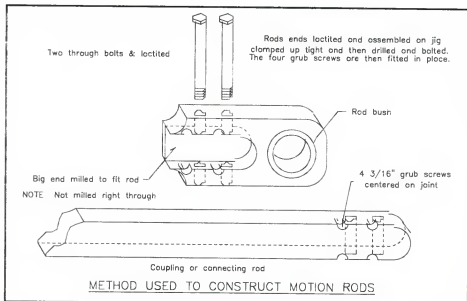
Compensated springing lever pin bearers are riveted to the outside of the frames with the rocking levers as per full size drawings. The main springs were made from ½" x ⅜" spring steel, with ends formed to take ½" diameter bronze bushes, to which shackle plates and pins were fitted. Spring leaves were made up to take an estimated weight of 44 pounds per spring and tested upside down on glass with the weight to check the deflection. Two overload coil springs are fitted into pockets on the top of the axle boxes, and are under slight compression with working load.

There were no suitable six inch wheels available so patterns were made (minus the balance weights which were fitted later) and cast at a Hamilton foundry. An extra one was ordered in case of blow holes and was needed. The wheels were machined and bored for a press fit. The axles are made from Japanese car McPherson struts with the chrome surface



Cylinder and valve gear detail on the completed model.

Photo: Beacon Printing & Publishing



making an excellent bearing surface in phosphor bronze plain bearings. If you decide to use this material make sure that it can be cut with a hacksaw, as some can be too hard to cut. Quartering was carried out using the jig described in *Model Engineer* (20 April 1990 page 453).

Crank pins were machined from silver steel, with the end caps turned and counter sunk for Allen cap screws and pinned to the end of the crankpin to prevent turning, pin being retained under the Allen screw head.

The coupling and connecting rods were too big to mill from solid material, so it was decided to build them up from mild steel with separate big ends as per above drawing. Walchaerts valve gear parts were all built up on jigs, gas welded, cleaned up and then hardened with 'Casenite' — the large forked ends

on the radius rods etc. being too daunting to hack from the solid, (Poor mans workshop with no milling machine). Milling on the lathe is limited to its capacity, but I managed the cylinder porting, rod ends etc.

Cylinders were clamped to the cross slide and the ends squared up with a fly cutter. Boring to size was carried out with a hefty boring bar with a fly cutter, between centers. The pistons are made of bronze and are fitted with two cast iron rings.

There is one double acting axle pump with a $5\frac{1}{2}$ " bore and $\frac{1}{2}$ " stroke and is fitted with a $\frac{1}{4}$ " SS ball valve.

Eventually with all the motion work and fittings attached to, the frames Fa 9 were ready for a compressed air test, and proved to run sweetly in both forward and reverse gears.

The smoke box was cold rolled by a local engineering shop. The first attempt was a bit rough, the second attempt was better but still needed some heating and further refinement, and after a lot of perseverance it came up to reasonable expectations. The material used was the largest flat, thin bar (500 mm x 6 mm) that was available. End plates were cut to fit and arc welded to the smoke box from the inside, with a flat plate fitted just level with the door to allow easy cleaning. A stainless steel ring was made up from flat strip and made to a tight fit in the rear of the smoke box, and then bored out to take the front of the boiler barrel. Lips at the top and bottom prevent the forward movement of the boiler into the smoke box.

A search through *Model Engineer* magazines found that Martin Evans 5" gauge *Waverley* design was almost identical to the Belpaire type boiler profile of the original Fa boilers. It was necessary to extend both ends and to widen the fire box to $7\frac{1}{4}$ " dimensions. The copper boiler is fitted with $\frac{1}{4}$ " diameter stays with two $\frac{5}{16}$ " full length replaceable stays. Silver soldering the boiler was carried out on top of a 44 gallon drum, this being just the right height at which to work. Hot summer days, a fire brick hearth and at certain stages

fire bricks packed around the boiler, helped to retain the heat where it was required. The 60 pound weight of the boiler required two propane torches with number 744 tips. The fire box crown is fitted with a fusible plug.

The regulator is fitted inside the smoke box unlike the original which is located inside the boiler. Boiler fittings to suit have been made from Martin Evans *On Shed* series. The clacks are made to NZR style, and the valves have tapered seats and guides. A good tip for future boiler makers is to leave about 3 stays on each side long enough to thread and nut, to facilitate fastening of the fire box cladding. This method has proved to be very satisfactory on the builders previous engines. The blower pipe runs alongside the boiler under the cladding (as per a number of NZR locomotives) and then through the smoke box.

The cylinder lubricator is a displacement type and is fitted with a non return valve between the steam valve on the turret and the oil tank. There is a very fine needle delivery valve at the top of the tank, which is extended to the top of the coal bin for easy access. No sight glass is fitted to the oil line.

The whistle is made to a Peter Olds brilliant and neat design and the secret of making a bell type whistle is to found in the *Model Engineer* of 4th June 1982. The tanks were built out of 16 gauge scrap copper tube rolled flat, and riveted to $\frac{1}{2}$ " brass angle. One tank is fitted with a plastic sight glass. The cab and coal bunker are made out of 16 gauge stainless steel sheet, riveted to $\frac{1}{2}$ " brass angle. All painting except the chimney and smoke box has been powder coated and baked professionally in satin black.

The locomotive balances out well loaded up with water and coal and loves a bit of rough uneven track. It is easy on coal and water and is simple to drive and operate.

To sum up, building a side tank locomotive from scratch, using only full size drawings, takes a bit longer to piece together, with

NZR Fa class 0-6-2T

Specifications

Length	62"
Width	15 $\frac{1}{4}$ "
Height	20 $\frac{3}{4}$ "
Weight	320 lbs
Coal Bunker cap.	772 cu."
Water tank cap.	3 gallons
Cylinder	
bore x stroke	2 $\frac{1}{8}$ " x 3"
Boiler	copper
Length	27 $\frac{1}{2}$ "
Diameter	6"
Fire tubes	26 x $\frac{1}{2}$ " OD
super heater flues	3 x 1" OD
Super heater tubes	$\frac{3}{8}$ " OD stainless
Operating pressure	100 psi
Grate area	33 sq. in



A bunker view of Fa 250.

Photo: Beacon Printing & Publishing

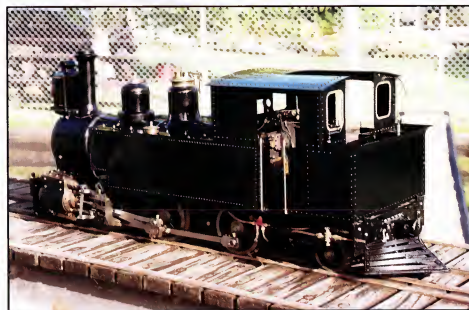
all the parts jostling each other in confined spaces. And the times one wakes up at some ungodly hour of the night with a solution to a

problem boiling away in the head, makes the game more challenging. My workshop has a 4½" Boxford fitted with a Norton gearbox

and a tee slotted cross slide. A small ½" drill press, a home made ½ ton press and the usual workshop accessories including home made bending rolls and expansion link slotting jig etc.



(Below): Fa 250 in steam on the Rotorua track. All other photos on this page were taken in Tauranga and illustrate the high level of workmanship Dave achieved in building Fa 250



New Zealand Railways 'Fa' Class 0-6-2T

by Murray Lane

The NZR 'Fa' class evolved from the 'F' class which first appeared in New Zealand in 1872. The 'F' class engine was a very successful engine and no fewer than 88 were supplied by seven British builders, and between 1874 and 1880 twenty five 'F' s were named after characters from Sir Walter Scott's novels. Several of these little engines have been preserved and are still in operation.

An interesting experiment which began in the early eighteen nineties was the rebuilding of several 'F' s from 0-6-0 saddle tank engines to side tank engines of the same wheel arrangement. In addition to the side tanks and a new cab, the rebuilt locomotives had larger cylinders and a larger boiler with a Belpaire firebox. The original inside Stevensons valve gear was replaced with outside Walschaerts valve gear and slide valves. The conversions were carried out at the Newmarket, Petone and Addington Workshops between 1892 and 1895, twelve 'F' s being altered to the newly formed 'Fa' class. One new locomotive was built in 1896 at Newmarket, the only NZR engine built in Auckland.

Because of the small and awkwardly placed coal bunkers, which limited their range of action the decision was made to add a trailing bogie and a larger rear bunker and in 1897 a new class 'Fb' appeared with a wheel arrangement of 0-6-2T. Between 1900 and 1904 all the original 0-6-0s were altered to conform to the improved design. By 1904 twenty locomotives were in service in both islands. Six new locomotives were built at the Addington Workshops in 1902-3, and in 1905 after the last of the 0-6-0s had been converted, the entire class was redesignated 'Fa'. All the later batch were fitted with piston valves.

The 0-6-2T 'Fa' was a handy little locomotive which saw service in many parts of the country. It was ideally suited to work on isolated lines such as the Whangarei, Gisborne, Picton, Nelson and Westport sections, and for many years did much of the shunting at Auckland. By the end of the first world war the 'Fa' was obsolescent, if not obsolete, and from 1919 the class began to dwindle in numbers. All had disappeared from the Government railways by 1943, but several saw service on private lines.

F88 was built by Dubs and Co. in 1880 and began service in New Zealand in 1881, based in Auckland. It was renumbered F250 in 1890. In 1892 it was fitted with a new boiler, built by Vulcan in England, and was rebuilt as an 0-6-0 'Fa' at Addington Workshops as number 5. It was transferred in 1897 to the then isolated Westport section and hauled coal from Seddonville to Westport. In 1900 it was converted to the 'Fb' class and in 1905 reclassified to 'Fa'. 'Fa' 250 worked the Westport section until 1943 having received a new boiler from Addington in 1924. It was then purchased by the Whakatane Board Mills for use on their company's private tramway. 'Fa' 250 was finally retired when the tramway closed in 1966. It remained in storage at Te Awamutu until 1996, when it was leased to the Goldfields Steam Society which runs a small railway out of Waikato to Waikino and is now the only one of its class that has been preserved. The table illustrates the specification differences to this locomotive in its various guises.

Specification Differences

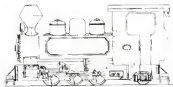
<u>Class</u>	<u>Number</u>	<u>Wheel arrang</u>	<u>Weight (tons)</u>	<u>Bore x Stroke</u>	<u>Driving Wheel dia</u>	<u>Boiler Pressure</u>
F	88	0-6-0ST	20.2	10.5 x 18	36.5	160
Fa	5	0-6-0T	23.5	12 x 18	36.5	160
Fb then Fa	250	0-6-2T	29.3	12 x 18	36.5	160



F250 sits outside the shed at the Whakatane Board Mills on 13 May, 1961

Photo: J Creber

Bunyip



A Bundaberg Fowler 0-6-2T in 7¼" gauge — part 1

by Ian S. Smith

Drawings and photos by the author unless otherwise credited

Editor's Notes —

The **Bunyip** construction series first commenced some years ago in the original AME magazine, but had not got very far when the then owners of the magazine halted production in 1990. Due to the high amount of interest that has continued to be shown in these locomotives, AME is continuing the series, but because many of the early issues are becoming difficult to obtain, we will start from the very beginning.

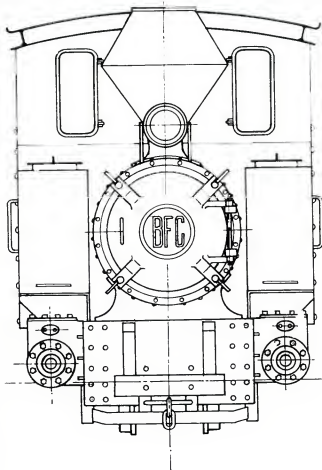
At AME, we have decided it is time to take the plunge, as outlined in the last issue (Newsdesk) and publish all measurements for **Bunyip** in metric only. In some cases

dimensions are shown to three decimal places but it is not really necessary to work to such fine tolerances. Also, in order to keep things simpler, we will stick to 7¼", or I should say, 184mm gauge. (The scale works out at Full Size x .302). Anyone building in 5" gauge would find it fairly simple to convert measurements to that scale. If you prefer to work in imperial measurements, divide all given dimensions by 25.4 and that will give you inches.

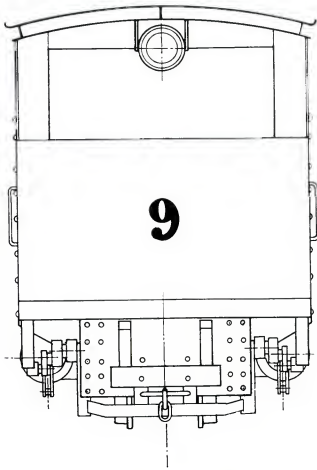
The introductory article (in the previous issue of AME), illustrates part of the variety of styles and colour schemes available to the modeller of the Bundaberg Fowler lo-

comotives. Drawings and castings are available — details to be announced soon. Now it's over to **Bunyip** creator, Ian Smith, and let's get into it!

The Bundaberg Fowler 0-6-2 tank locomotives were built in the early 1950s by the Bundaberg Foundry Co. in Queensland, Australia. Nine were ordered but only eight were completed — all have been preserved, three still in steam. The other five are in storage and in differing stages of restoration. They were built for the sugar industry as a light locomotive able to haul heavy loads of cane across roughly constructed railways in the cane fields. An exceptionally successful design,



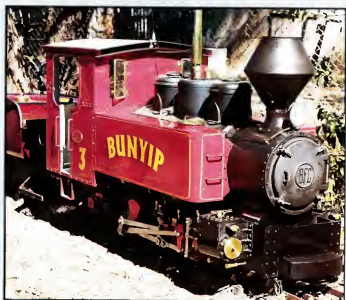
FRONT ELEVATION



REAR ELEVATION



Len Cottrell regularly runs his Tom Thumb, the first 'Bunyip' to be completed, at the Diamond Valley Railway



Bunyip belongs to Ian Smith. This was the third one to be completed, and is seen here at its home track in Canberra.



(above) Graeme and Kaye Clarke are the proud owners of the fourth 'Bunyip', Kaye-C. Graeme gives it a regular workout on his private track near Bairnsdale in Victoria, while the second one, Joyce, (below) is owned by the Diamond Valley Railway



they were only retired due to the advent of the diesel engine.

Broad dimensions

A 184mm gauge model makes a powerful locomotive with 79.375mm x 108mm (3 1/8" x 4 1/4") cylinders. A working pressure of 700 kPa (100psi.) gives a nominal tractive effort of 393 lbs with 212mm diam. wheels, or 415 lbs with 203mm diam. wheels, calculated at 80 % of boiler pressure.

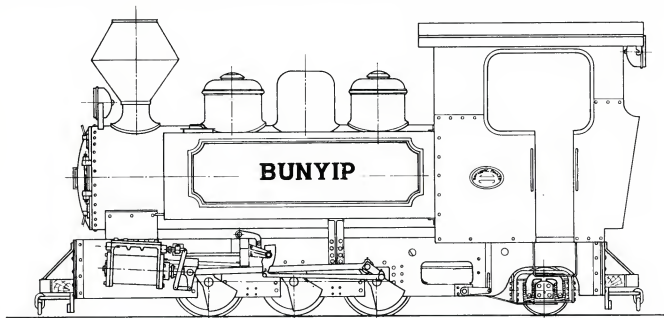
The approximate weight of the locomotive is 545kg empty and approx 645kg in running order, and it is 1.956m long over the buffers x 686mm wide and 953mm high.

Before commencing construction of a 184mm gauge Bundaberg Fowler, a few words on the origin of the name *Bunyip* may be in order, as overseas readers may not be familiar with this term. The *Bunyip* is a creature in Australian Aboriginal mythology which, they believe to be a great monster from their Dreamtime. Our little engine is a monster on the track and has proved to be very worthy of the name she carries.

Main frames

The frames are cut from two pieces of 6mm MS plate 1671.65mm long x 185.72mm wide. Each side is identical except for the length of the opening under the cab on the left hand side where the ash-pan is located. It should be noted that the connecting rods drive on to the rearmost of the three axles, and that the centre of the axle is 47.62mm above the base line of the frames when the engine is fully fuelled and in working trim. The reason there is a difference in size, is that the steam brake cylinder is mounted on the right hand side

Before proceeding to mark out one of the frames, ensure the ends are square and both plates are exactly the same length. The frames are then machined. Care should be



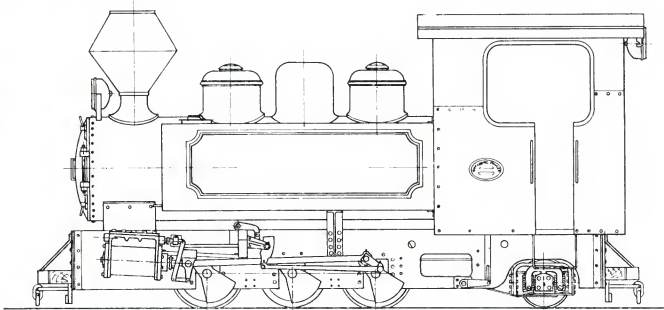
Overall Length = 1917.7mm
 * Width = 612.7mm
 * Height = 952.5mm

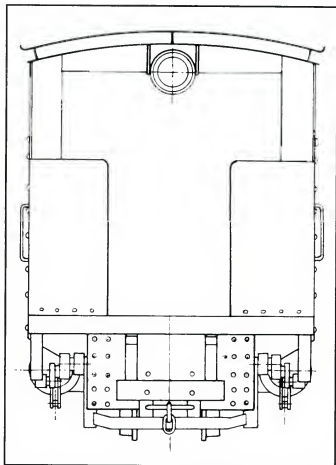
taken in marking out the cylinder centre line. This must intersect two points — the centre line of the driving axle, and a point which is 758.82mm horizontally forward and 93.64mm up from the bottom of the frame. Locate this point very carefully as the cylinder centre line passes through this point. As a rough check,

the slope of the cylinder centre line is approximately $3\frac{1}{2}^\circ$ to the horizontal. A further check is the centre to centre distance between cylinder and driving wheel axle of 760.4mm shown on the drawing.

Following the normal procedure, after all the holes and openings have been marked out

on one frame clamp the two frames together and drill a couple of locating holes through both plates at opposite ends of the frames, and a couple about mid-length along the frame. Bolt the two frames together with 6mm bolts or secure with roll pins. The sandwiched frames can then be machined as a matching





This rear elevation shows the alternate bunker style. Compare with the other rear elevation drawing on page 27

pair on a vertical milling machine, or cut by hand.

While the frames are still together cut out the hornblock and the pony truck openings. Cut these either with a band saw or gang drill and file to size. Mount the frames on a vertical milling machine table and mill the horn openings taking particular care with the size of the opening. The axes centre distance of 265.1mm is crucial and a lot of care here will save upset later when making the coupling rods. Separate the frames and cut out the Ash-pan openings on the right hand side at 161mm long x 70mm wide. The left hand side is 238mm long x 70mm wide.

Proceed to drill all the holes through both plates, except for the four holes near the ash-pan opening shown as 54mm and 61mm from the top the frame. These are the mounting holes for the steam brake cylinder and are drilled 5mm and tapped 6mm. The two sloping holes next to the pony truck opening, are for the brake spring return bracket.

The opening for access to the ash-pan under the cab can be drilled through from the right hand side. The left hand slot can be extended towards the rear later.

Note: All holes for the horns and the cylinders, and the holes for the valve slide support brackets; four holes above, and in front of the front axle; and the motion bracket between the first and second axles require fitted bolts.

either side so the holes are symmetrical on the plate. Mark all holes for buffer mountings and the angle iron clamping brackets. Separate the plates, clean them up by removing all burrs and lightly countersink both sides of the drilled holes.

There are four angle iron re-enforcing pieces 25mm x 25mm x 6mm x 185.72mm long, which are riveted on to each buffer plate and then bolted to the main frames. Machine the outside of the angles so they are square. When the frames and buffer plates are put together the frames might be out of square if you are not careful. Clamp one angle to each end of

To ensure a neat fit, drill 5mm holes first then open them out to 6mm when everything is finally fitted together.

Before separating the frames, there needs to be a 2mm hole drilled through both frames for setting the valves, 95mm from the trailing edge of the driving horn block opening and 15mm up from the bottom of frame.

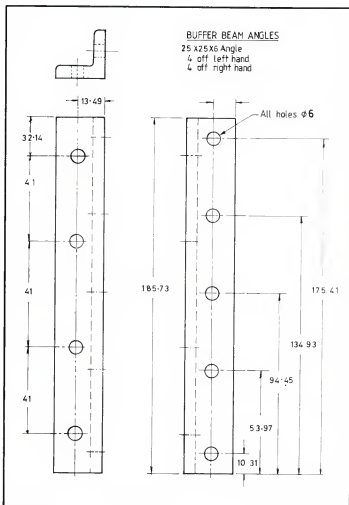
Buffer plates

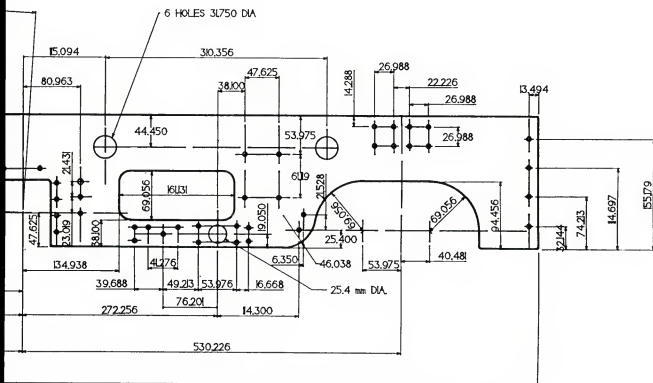
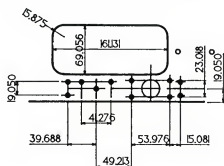
These are made from 6mm steel 375mm x 185.72mm. To ensure accuracy clamp the two buffer plates together and tack weld them. I put two small welds on top and bottom of the plates. Square the ends in the milling machine, and mark the long centre line by dividing the 375mm side in half. Work from that line

the frames on the inside, flush with the ends. Drill the holes through the angle using the frames as a drilling jig. Number the angle, and the frames, so you know where they came from. Next, take the other angles, clamping one drilled angle and undrilled, sit them on a flat surface and drill through the same way you have just used on the original angle. Now bolt both angles on to the frames. You are now ready to assemble the frames and buffer plates.

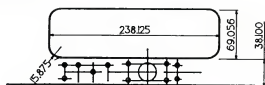
Before fitting the buffer plates, I made up four 311.15mm long spacers out of 40mm diameter bar. Drill and tap the ends, 5mm, and clamp the two side frames with the spacers in between. Sit the frames on a flat surface to square them up. One way to check them for square, is to measure the frames diagonally across the corners. You should have the same measurement in both directions. Clamp the buffer plates to the angles making sure they are even. Drill through the holes in the buffer plates. Bolt all together and check that the frames are still square. Number the other angles and buffer plates, so when you take them apart to rivet the angles to buffer plates they don't become mixed up. I left mine bolted until I had finished the buffer and derailment bars, then riveted them on.

The rear buffer plate has a slot milled to take a draw bar to connect the riding truck to the locomotive. This slot is 100mm long x





- HOLES 15.875mm DIA.



NOTE: 4 HOLES TO LEFT OF
CUTOUT ARE NOT REQ.
FOR L.H. FRAME.

LEFT HAND FRAME DETAIL

TITLE Ø-6-2T BUNYIP LOCOMOTIVE FOR 7 1/4 INCH GAUGE

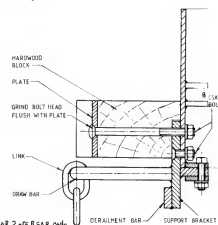
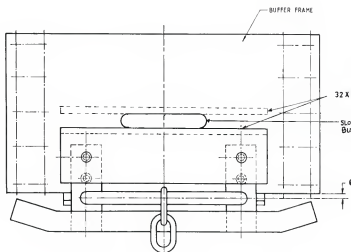
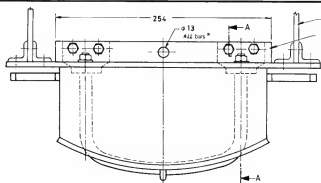
MAIN FRAMES

DRAWN

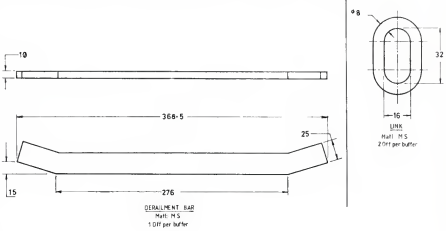
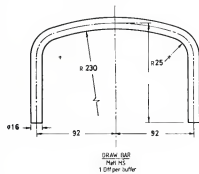
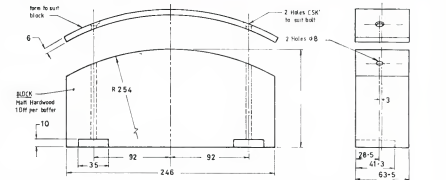
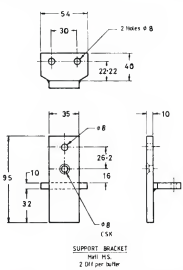
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SCALE

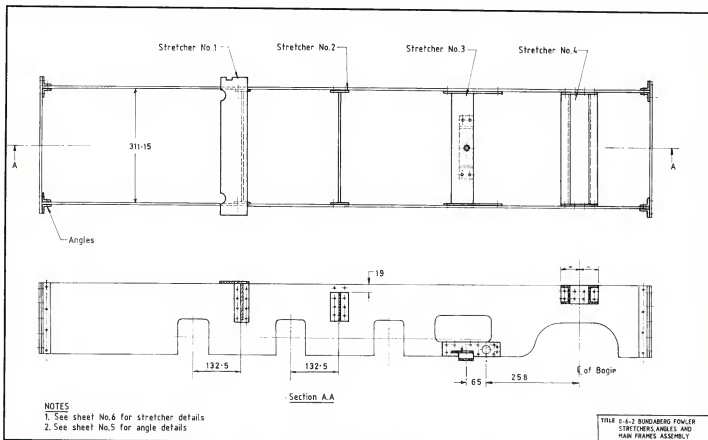
REV. 1



TITLE 0-6-2 BUNDBERG FOWLER
BUFFER AND DRAW GEAR ASSEMBLY



TITLE 0-6-2 BUNDBERG FOWLER
BUFFER AND DRAW GEAR DETAILS



stretcher square in a vertical milling machine. Machine the 8mm end pieces using a long series end mill and bring the stretcher to 311.15mm wide. Before removing from the mill, machine the two 16mm radi semi-circular cut-outs in the top plate 139mm either side of centre line 16mm deep to allow access to the spring adjusters.

Mark out the three holes on each end of the top plate. The two corner bolts are 6mm in from each edge and the third hole is 35mm from the back edge. Drill 4.3mm tapping hole the don't drill them 5mm yet as you can use the holes as a drilling jig. There are four 6mm holes to be drilled in the cross web, two on either side of the centre line at 200mm centres, 27mm apart and 8mm from the bottom.

Stretcher No. 2 is made similarly to stretcher No 1 without the top plate welded on, so follow instructions for No 1.

Stretcher No. 3 is the bogie pivot stretcher and it also has the brake shaft running through it. It is made like No's 1 and 2. The only thing I did that is not marked on the drawing is I tack welded a 298.5mm spacer in at the 100mm end to stiffen up the side plates so they will not spring when machining the sides. Mark out the pivot holes on the centre line 19mm in from the inside edge of the cross member. The four bottom support bracket 6mm holes, two on either side 75mm from the centre line, 19 apart and 10mm in from the same edge.

The "U" shape bracket under this stretcher was bent up in a press between two blocks. Take a piece of scrap steel 40mm wide and

mill a 16mm deep groove, 127mm long. Take another piece of steel the same width, mill a step in it 16mm deep, to leave a flat, 50mm long each end.

How does it work? By putting a piece of steel 40mm wide x 230mm long x 5mm thick between the two blocks, placed evenly over the 16mm groove and the 16mm raised section (facing down), press the two blocks together until they are tight. You should end up with a 16mm offset. Cut bracket to size. Position and clamp bracket under stretcher and drill the four holes. Put four bolts in the bracket then drill a pilot hole through the pivot. Take apart to drill and ream 16mm in stretcher and 12mm in support bracket.

Stretcher No. 4 was made up out of channel bent to 54mm x 25mm x 3mm thick x 298.5mm long. Clamp the two channels together and mill the ends square to 289.5mm long. Clamp a 50mm block in between the two channels with the flanges pointing out, and square up. Then weld on the two end plates 75mm x 54mm x 8mm thick before machining the stretcher to size. Weld on a piece of steel 44.5mm x 50mm x 3mm thick on the right hand side to take the steam brake stand and mark out the hole for the brake stand; drill 17.5mm. Next mark out the four 6mm holes to take the bogie equalising bracket, 31mm either side of centre line, 27mm apart and 13.5mm from bottom edge.

Finally position all four stretchers between the frames. No. 1 is positioned 132.5mm from the centre of the leading axle to the front edge of the cross web and hard down on the

top edge of the frames. No. 2 is positioned the same, 132.5mm from the centre of the second axle to the front edge and 19mm down from the top of frames.

No. 3 is positioned with the long side plates facing to the rear of the frames and the 'U' shape bracket underneath. To set the bogie pivot in the right place it should be 65mm from the brake shaft hole in side frames (centre to centre). The end plates of the bracket are flush with the bottom of the side frames.

No. 4 is positioned flush with the top of the side frames 258mm from the centre of the brake shaft hole to the centre between the cross channels. Make sure the inside of the stretcher channels are square down the frame otherwise the bogie equalising pivot will not work properly.

Now check that the frames are still square before drilling the mounting holes. Use the holes in the side frames as your drilling jig. Open out the holes in stretchers No 2, 3 and 4 to 6mm and fit the bolts. Leave No 1 stretcher with 5mm holes till fitting motion bracket. When it is all bolted up the frames will weigh about 40 kg. Watch the hernias!

To be continued ...



Note: Castings are available for Bunyip as are separate sheets of drawings. The drawings are also available showing imperial measurements for those who prefer them. Full details on where to obtain these will be announced in the next issue.

Bunbury '98 — 42nd AALS Convention

Story and photos by David Proctor



The setting of the South West Model Engineers track in Bunbury is typified in this panoramic view, showing the station building to the left, elevated track, storage shed and clubroom over to the extreme right with the roundhouse a little to the left of it.

It was a long trip to get to the 42nd A.A.L.S. Convention, starting off with a 40 minute flight from Canberra to Sydney and then a 5

hour flight to Perth, followed by a 2 hour drive down to Bunbury. Still that was not as far as those from Townsville had to go, and

their trip was nothing compared to that of Fred Springer from the South Western Live Steamers in Texas, USA. Most people are aware by now that the Convention was moved to the South West Model Engineers Association's club grounds in Bunbury from Castledare only a few weeks before the event.

Many would also be aware that the reason for the late change was brought about by the discovery of asbestos in some soil that had been brought into the Castledare site as fill. This discovery led the WA health authorities to close the site until some remedial action can be taken to eliminate the problem. Plans are well under way to do just that, and in doing so, will result in the Castledare Miniature Railway having an even more interesting site than before. The intention is to resume running by May, or June at the latest, so by the time you are reading this, the trains will be running again at Castledare.



(Above) Linda Hall from Gippsland spent a lot of time at the controls of her Ian Willis built, Honda powered steam outline loco, Lindy Loo, while (below) Castledare's Frank Ryan gives his model of a Union Pacific Gas Turbine Engine a turn on the track.



Len Stampton from the BHP Western Port club in Victoria really looks the part when sitting behind his vertical boilered Alma





(Above): The locomotives of John and Merv Steadman from Altona are known for spending more time on the track at conventions than any other. (Below): This little bright red caboose from the Bunbury club sat in the storage sidings all weekend.



The late change of venue meant a lot of extra work for Convention organisers Ken and Sue Belcher and their helpers. They succeeded admirably. As Ken said, they were able to keep to much the same programme as arranged for Castledare, with only the location being different. It was not that simple though. There was a lot of extra work as catering arrangements were all different, accommodation bookings had to be altered, with less venues being available and a new Civic Reception was set up at short notice.

Thursday

I flew out from Sydney with Barry Glover, arriving in Perth about 1 am. After a rough landing we found a motel for a few hours sleep, until we had to return to the airport about ten o'clock to collect a set of wheels and A.A.L.S. Secretary, Peter Manning, who had just arrived from Adelaide. We then set

off for Bunbury, about 180k south of Perth. About halfway, at Pinjarra, we came upon the Hotham Valley Tourist Railway and of



Taffy II, owned by Jim Crawford from NDMEs, was one of the few locomotives to be seen on the elevated track over the weekend

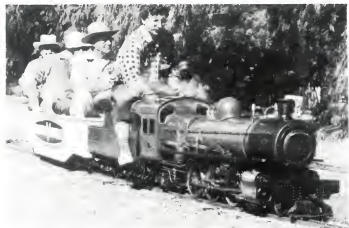
course, we had to stop and inspect it. They have a large range of WA steam and diesel locos along with a large collection of carriages from WA., Tas. and South Africa. This proved to be thirsty work and we felt obliged to inspect the nice old pub close by. It passed inspection and also proved to be a good place for lunch.

We arrived in Bunbury mid afternoon and our first call was the tourist information centre for directions. The information centre turned out to be in the old Bunbury Railway Station, an elegant old building which became redundant when the railway terminus was shifted a couple of kilometres south. We then found our motel, checked in and then headed off for the track, which was close by, to register. Here we met Conference organisers Ken and Sue and were each presented with a convention "showbag". After some socialising it was time to go and freshen up ready for the Mayoral Reception which was held for all the convention goers on Thursday night in the Council Chambers. We were all welcomed in grand style by the Mayor, a man obviously proud of his city. At the reception, the winner of the refund for early registration was drawn and the lucky person was Glen Templeman from South Australia.

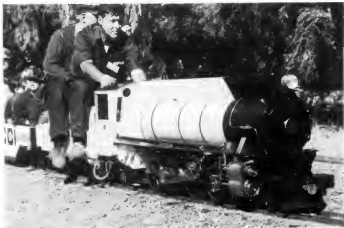
The location

The South West Model Engineers track in Bunbury is in a very pleasant location at the end of a large reserve, Forest Park, which it shares with various sporting clubs. The side of the reserve where the track is located is very pretty and well sheltered with many large shade trees, the most numerous of which are large pepper trees. The track is in the form of two large distorted ovals, the outer one being about twice the size of the other. The inner track comprises all gauges whilst the outer one is 7 1/4" only. Both circuits wander amongst the trees, under which is to be found an old WA railway station, and the club's extensive range of storage buildings and clubrooms.

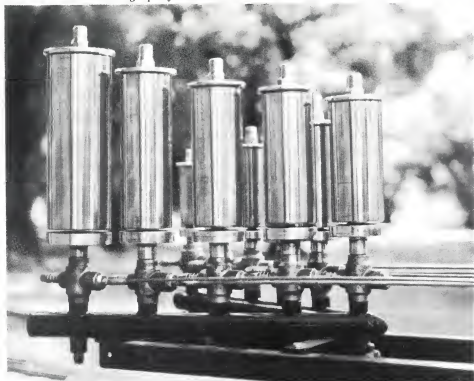
The distance from the east made it difficult for many people to take their locomotives and this was reflected by the smaller number in attendance by comparison with recent conventions. Numbers of visitors varied from day



Steve Reeves from Castledare has settled in to driving this WAGR light pacific in the Grand Parade



Rodney Pitt in the same location with his WAGR/Silverton Tramway 'W' class Beechina



This pleasant sounding calliope operated on compressed air. The rods lead to a keyboard

to day with Saturday and Sunday being the most popular, where the numbers were somewhere around the 150 mark. The locomotives in attendance averaged around 30 to 35, some days being higher than others. A fair percentage of the locomotives were from WA and of the total only 6 were 5" gauge. The rest were all 7 1/4" which seems to be the most popular in the west.

Friday

Friday morning saw some of us line up at the local McDonalds for breakfast. By the time we got to the track some locos were already at work, while many more rested in the steaming bays as their owners caught up with old friends. John Cummings from the Blue Mountains was giving his C-35 an early workout, accompanied by Phil Gant from Hornsby with his C-32. On the 7 1/4" circuit, Linda Hall from Gippsland was contentedly driving her Honda powered *Lindy Loo*, which

was continuously on the go for the whole weekend. I was able to catch up with Len Stampton, who was there with his vertical boilered *Alma*, which will be featured in an upcoming issue of AME.

Lunch was provided each day by the local Guides and they did a great job — no one went hungry! Playing trains and talking continued on throughout the day until it was tea time, when again the inner person was well catered for. An excellent self-serve meal was provided by local caterers every evening.

After tea, while some were enjoying a night run, it was time for the AMBSC Annual Meeting, a scene of some lively debate. AMBSC Technical Representative, Ross Forsyth was delayed in Sydney, in the Harbour Tunnel, and arrived late. In good Hollywood style he rushed in rather breathless just as the meeting was calling for his report. Ian Kirby from Illawarra was elected AMBSC Chairman, unopposed, to replace Eric Evans,

who has retired. Neither gentleman was in attendance.

Saturday

Saturday was the big day and, as was to be the norm for those of us on a 'health diet', started off at 'Maccas', followed by an early start at the track. There were several extra people around as some had come down from Perth for the day. The usual line up of locomotives was on the track including the Steadman twosome, John and Merv, who must once again, take the record for the greatest number of hours in steam at a Convention. After lunch Bunbury's Deputy Mayor, Judy Jones, performed the Official Opening which was followed by the grand parade. The Mayor was unable to attend as the last minute change caught him already booked. He made up for it by attending most of the remaining weekend with various members of his family.

The people with locos were having a good time on the track, while the rest of us looked on, or found a good spot to sit and talk. Sometimes it was hard to tell which was the truth



AME Under 25 Award winner, Craig Belcher proudly displays his winning IC engine



Nellie belongs to local club member, Phil Smith, and is seen here taking her place in the Grand Parade.



Convention organiser, Ken Belcher, sits in comfort in his WA Wildflower d.m.u. railcar set, Banksia

and which were the lies! Frivolity, joke telling and practical jokes were liberally sprinkled throughout the entire weekend. Paul Sherman from Castledare lost his hat, complete with badges during the day. The number of badges made the local "scrappie" the prime suspect!

Saturday evening, after another excellent meal, was the time for the A.A.L.S. Annual

General Meeting and this was well attended. There were no contentious issues, all matters being resolved in the affirmative through the postal voting system this year. John Wakefield was re-elected Vice President, the only executive position falling vacant this year.

Sunday

Sunday, like every day before it, provided great weather, not too hot and not at all cold. During the day, some people started to drift

off to begin their long trips home while the rest of us had another great day playing and talking trains (or something!). I took a break from my AME duties and spent time driving John Cummings' NSW C-35 while he had some lunch and a chat. It really is a hard life!

Dinner on Sunday evening is traditionally the time for the presentation of Awards. The vote for **Most Popular loco** went to Phil Gant of Hornsby for his 5" gauge NSW 3203 and it was my pleasure to present the AME



This NSW C-32 class locomotive, belonging to Phil Gant from Hornsby, was voted Most Popular Locomotive at the Convention

(Above): This calliope was operated by air when the keys were played. (note the classy mag. cover on the right). (Below): Local man, Cliff Pole of Falcon brought his 422 diesel, which he built to the series in AME.



Lindsay Adams of NDMES, Balclutha has achieved a very high standard indeed with his model of an early WAGR 'A' class 2-6-0



Craig Belcher takes a turn at the controls of WA 'D' class 1565, belonging to the Bunbury Club

Under 25 Encouragement Award to 17 year old Craig Belcher for his model of an internal combustion engine. The Bolton Trophy, along with the other trophies, was not awarded this year. The feeling of the respective judges was that there were insufficient entries. As usual after dinner, the keenest were on the track again for a night run. For me it was time to bid farewells and thanks to hosts and friends as I was leaving early the next morning. Ken and Sue did a great job of organising the whole weekend, and Jeff Clifton and the team from Bunbury really pulled out all stops at short notice, to ensure we all had a good time.

Monday

I left Bunbury early on Monday morning in the company of Peter Manning, having decided to travel to Perth on the *Australind*. The trip was about two hours and the train is a modern, very quiet and smooth diesel railcar set. We were met at Perth station by Dick Langford and taken to the Northern Districts Model Engineers track at Balcatta, where we met up again with several convention goers. The Balcatta track caters for all gauges up to 5" and they have plans to lay 7¼" which will be a totally separate circuit. They have transformed a small part of an industrial area into something really impressive. Like most places we saw around Perth it was built totally on sand. There was a small display of models set up on a table and one that took my eye was a beautiful 2-6-0 completed by Lindsay Adams, who acquired it as a running chassis. Some members of the local garden railway modellers had a layout in operation, on which the locomotives were both electric and live steam.

After lunch, a small group of us went out to Whiteman Park to see the 2ft gauge Bennett Brook Railway and the Perth Tramway Museum. The 2ft gauge railway has a Perry 0-4-2T from the Inkerman Mill, which used to sit outside a children's home in Home Hill, Queensland, as well as two massive South African NG15 2-8-2 tender locos. Both these locos had the plugs out as their boiler inspections were due. There were only two diesel locos running as the fire-ban season

was in force, but we were allowed to go through the workshops and view the steamers.

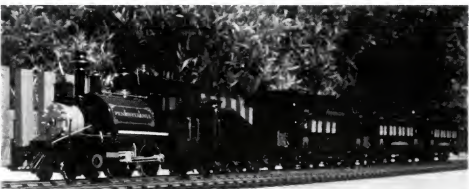
We then went over to the Tram Museum but everything was locked up. After a bit of a look around we wandered over to the station and rode on an old Melbourne tram. During the course of a conversation with a man who turned out to be the Chief Conductor, he offered to take us through the workshops. This he duly did to our great satisfaction — a very pleasant afternoon.



John Smith of Castledare takes his 0-4-2, Edna May, around the track. The name on the tender was applied by a previous owner.

That was the end of my trip to the West. After having tea with two new friends from South Australia, I killed time at the airport until 12.30 am when I caught a plane (it was an hour late) home, this time via Melbourne. I have since heard that Paul Sherman found his hat, but I did not hear where!

Next year, the Convention is at Edgeworth, NSW and the following year (2000) was confirmed for Warner on the northern outskirts of Brisbane.



Some scenes at the NDME track at Balcatta. (Above) Part of the garden railway display and (below) a view of the grounds from the overhead footbridge near the station



A Lead Screw With a Difference

by Alby Smith

The appearance of the second hand Myford ML7 lathe was good. The bearings appeared tight and apart from a few minor nicks, the bed showed minimum signs of wear and abuse. The lathe had been well lubricated during its life, evidenced by lashings of Molybond (MoS₂) oil dripping from the working parts.

When bolting down, the Myford was levelled to a standard where a chucked piece of free-cutting mild steel could be turned parallel to within 0.0005" over 4 and a bit inches.

Is the leadscrew accurate?

Like most Myford owners, I use the leadscrew for feed as well as thread cutting. For the past year or two I have noticed when thread cutting, a need to go deeper than the specified amount. When trying the 'fit', the first few threads were sloppy, then after several turns, the assembly started to bind. Although this was annoying, I could get by for 'rough' work providing the thread was cut under size and then finished with a tap or die.

Every time I walked into the workshop, the leadscrew always caught my attention. Where it was used the most, the Acme form had taken on the appearance of a screw-in light globe thread. In other words, the crest of the thread, instead of being flat on top with near sharp corners was now radiused.

My cobbler, Brian, swore he could see a reduction in diameter and flank wear.

After a phone call to Myford, a replacement leadscrew and half-nuts arrived by air.

The worn parts were removed and Brian's observation was correct. When measured 5/8" (130mm) from the left hand end of the Acme thread, the major diameter was 0.0215" (0.55mm) less than the unused sections of the leadscrew. The threads of the die-cast alloy half-nuts were worn thin and embedded with ultra fine particles of swarf.

The question was — how long would the new leadscrew last before taking on the appearance of a light globe thread?

Electroless Nickel Plating

During the latter years of my paid working life, I became aware of a very useful process — Electroless Nickel Plating.

The major properties of Electroless Nickel Plating (ENP) are:

1. Low coefficient of friction with natural lubricity. Against steel — 0.13 lubricated, 0.14 dry. This is about 20% better than hard chrome and one half that of steel.

2. High hardness. From 46 - 48 Rc as applied; 60 - 62 Rc when heat treated at 200°C and 65 - 68 Rc plus at 400°C. Heat treatment also improves adhesion to the base metal.

3. Because ENP is classified as a 'cold process', there are no detrimental effects to the base metal. In particular, hydrogen embrittlement is avoided.

4. Corrosion resistance. When subjected to a neutral salt spray test as per ASTM-B117, a coating 0.001" (0.02mm) thick provides 300 hour protection. A coating 0.002" (0.04mm) thick provides 1000 hour protection. For comparison, a zinc coating 0.002" (0.04mm) thick provides less than 100 hours protection.

5. Uniform coating thickness. Unlike some other forms of plating, for example, hard chrome, ENP offers uniform thickness even on sharp corners.

With the above in mind, the decision was made to ENP the replacement leadscrew. At a cost of \$40.00, a Melbourne firm applied a 0.001" (0.025mm) thick coating of EN to the acme thread. To increase hardness and adhesion, the part was heat-treated at 200°C. With the half-nuts burnished with Molybdenum, together with the leadscrew, were assembled to the lathe.

How long will the Electroless Nickel Plated leadscrew resist wear from fine steel particles embedded into the 'new' half-nuts? The short answer is I don't know. However, I am now 61 years of age and I would like to think that the extra hard slippery surface will be giving effective service long after I have 'jumped the twig'.

In the world of model engineering, the applications for ENP could be endless. For example, journals of all types, bores of steam cylinders, other steam engine/locomotive components, crankshafts/camshafts for IC engines and workshop tools (corrosion resistance), etc. To do, it would be a case of a good 'off-tool' surface finish, with an allowance being made for plating, then ENP to the desired thickness before assembly.

Leadscrew—what's it made of?

I was curious as to what type of steel was used to manufacture the leadscrew. A piece cut from one end of the old leadscrew was held in the chuck and I then proceeded to turn the OD by taking a relatively heavy cut at high revs without coolant. When the swarf came away without a sign of heat discolouration my subjective thoughts were FCMS (free-cutting mild steel). Next, light dry cuts using a fine feed resulted in a superb surface finish. Only chemical analysis would offer proof, however, the above simple test indicates that Myford leadscrews are, or may be manufactured from free-cutting mild steel of the leaded variety.

In the meantime, with the trays full of blunt end mill cutters and slot drills, the time had arrived when I needed to build a tool and cutter grinder. The Stent grinder was chosen

and off went an order to England for a set of castings.

Thanks to my friend 'Fettler', the castings arrived by passenger liner. After stress relieving at 540°C for one hour, I made a start. Unfortunately, at this time the worn leadscrew and half-nuts were still in position and the decision to replace these items was some time away. The micrometer feed screws were relegated into the too hard basket.

Postscript

The micrometer feed screws and nuts for the Stent tool and cutter grinder are now complete. With the replacement leadscrew and half-nuts fitted, the thread cutting was a joy and when taking the finishing cuts, the stainless steel swarf came away from the tool in uniform, fine crinkly ribbons.

Soon after I made the feed screws, Brian paid a visit. After inspecting the thread finish he turned the feed screw and felt for wobble — sloppiness if you like, in the bronze nut. No comment, just a raised eyebrow and a nod of his head. Knowing my mate from the days when we served our apprenticeship together in number 11 tool room at H V McKay's (later Massey Ferguson) at Sunshine, the body language said it all. Yes, the replacement leadscrew and half-nuts would perform as intended.

For your entertainment, here is Sonnet 195 from *Hood's Book of Serious Poems* (1880) sent in by Darryl Cleburne

ON STEAM

BY AN UNDER-OSTLER

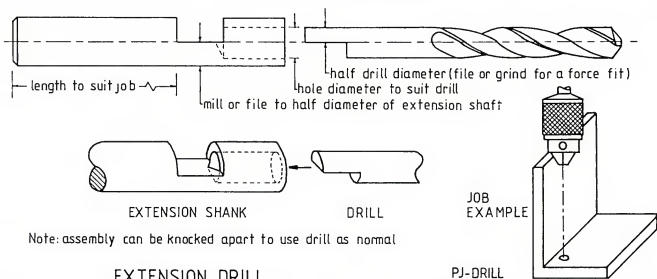
I WISH I liv'd a Thowsen year Ago
Wurking for Sober six and Seven milers
And dubble Stages runnen safe and slo
The Orsis cum in Them days to the Bilers
But Now by means of Powers of Steem
forces
A-turning Coches into Smoakey Kettls
The Bilers seem a Cumming to the Orses
And Helps and naggs Will sune be out of
Vittels
Poor Bruits I wunder How wee bee to Liv
When sutch a change of Orses is our Fairs
No nothink need Be sifted in a Siv
May them Blodd ingins all Blow up their
Grates
And Theaves of Oslers crib the Coles and
Giv
Their blackgard Hannimuls a feed of
Slaits!

Does anyone know what the last word "Slaits" means?

An Easy Extension Drill

by Peter Johnson

Drawing for publication by Peter Hall



Note: assembly can be knocked apart to use drill as normal

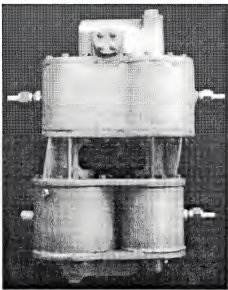
EXTENSION DRILL

PJ-DRILL

Product Reviews

Boiler Feed Water Pump for 5" Gauge

What about this to give you super detailed 5" gauge loco a bit of one upmanship. Les Sheppard has for some time now, been producing some very nice working cross-compound Westinghouse pumps to 1 1/16" scale. In actual fact, they are not cross-compound pumps as only one cylinder actually works, the other cylinder is a very cleverly concealed lubricator. Also they are designed to pump



water and to be used as a boiler feed pump. They were originally intended for installation on 5" gauge NSWGR 38 class engines. It was soon discovered that with minor detail modifications, they were also suitable for use with NSWGR 57 and 59 classes. In fact any prototype or freelance engine built to 1", 1 1/16" or 1 1/8" will not look out of place with one of these perched up on it somewhere.

Both variations are produced in small batches and are a good, but not exact copy of the prototype. Brass, bronze, and stainless steel are the materials used and most of the visible screws have hex heads. Workmanship is of a very high standard and there are no unsightly machine or file marks.

The pumps are very well packaged, wrapped in cardboard and placed in a cardboard postpack filled with polystyrene beads. **Beware!** Before opening go outside and place the unopened package into a garbage bag and open carefully, making sure that all of the polystyrene beads are contained within the bag. (It is preferable to perform this operation in the nude). Ignore these instructions at your peril! Any person that has ever had anything to do with the dreaded polystyrene bead will immediately understand the reason for the warning. These beads are all born with a mind of their own.

Amongst the beads will be found a three page instruction sheet, giving clear instructions on the installation and operation of the pump. One of the sheets has a drawing of the pump, showing the position and function of the various pipes etc. The other two sheets cover the operation and general maintenance details.

Suitable mounting lugs are provided. I have fitted three of these pumps and have encountered no real difficulty. However, it must be remembered that great care must be exercised as damage can occur to threads and fittings if you are too ham-fisted. The biggest problem that I encountered was with the fixing of the exhaust pipe as the threaded fitting is rather difficult to get at. Care must also be taken in mounting to ensure that there is ready access to the lubricator filling and drain plugs.

In service they seem to be very reliable, and when run in, they will tick away for hour after hour and can be relied on for most of your boiler feed. One problem common to all of this type of pump is that when cold, the exhaust is very wet and makes rather a mess if the exhaust pipe is mounted behind the chimney, as is the case with a lot of engines. Some sort of separator can be fitted, but this is left up to you.

This is a high quality, well designed product that does what it is designed to do. There are a number of full sized prototypes that had compound pumps fitted, so the two types available should suit most applications. It can be mounted as is, or if you desire, extra detail (dummy oil pipes, etc) can be added. As it is not a cheap accessory, care in fitting and operation should be exercised, so as to achieve a long working life and value for money.

Boiler feed water pump for 5" gauge

Price: \$800 (plus postage & packing)

Available from: Les Sheppard,
44 Chapman Street, Moss Vale. NSW 2577
Phone (02) 4868 2404

Barry Potter

Club Roundup



compiled by Neil Graham

Adelaide SA

By the time this is read the special single line bi-directional running day set for 9th May will have been run. The format of the special run is to have timetabled freight trains to run for a specified time and simultaneously a train will be working in the opposite direction. A simple staff system to ensure safety in working bi-directions and crossing loops to be utilised to allow trains to pass.

Adelaide Miniature Steam Railway Society Inc.

Location: 370 Regency Road, Prospect

Public Running: 1st Sunday

Moorabbin Vic

The February night run proved to be very popular, so much in fact that the next running day turned into a night run as well!

The signals department reports initial success with trails of the passive infra-red (PIR) detector unit at the tunnel entrance. If proven reliable, then it may mean goodbye to the cleaning of the track detection sectors for good!

Silvertops running days are so popular that they have been declared official runs. In the first three months an average of 25 members and seven locos have been attending.

The public days have seen over a dozen locos on average and forty odd members attending. On the 1st March public day, two generations of one class of VR power were seen on the tracks with X52 (electric) ran a freight special while X36 (steam) was on passenger hauling duty.

The Steam Locomotive Society of Victoria

Location: Rowans Road, Moorabbin

Public Running: 1st Sunday except January

Gosford NSW

The trestle bridge now nears completion. All that remains to be done is some timber work and the laying of the 5" gauge rail.

A scorcher of a day was the Australia Day display, but everyone seemed to enjoy themselves and many flyers were handed out to the interested public. February run day saw 10 locos on duty. A hot day which kept many drinks being run to the loco drivers and staff. March run day started with a couple of locos being retired early and a sole 59 class remained to do the runs. Later, more locos

turned up and re-charged electrics returned to run the remainder of the day.

Central Coast Steam Model Co-op Ltd

Location: Lot 10 Showground Road, Narara

Public Running: 1st Saturday

Auckland NZ

Auckland Society of Model Engineers

Thanks to the "Tuesday Club" a new galvanised railing has been installed above the long tunnel entrance portal, making it safer for all concerned.

The last "bits and pieces" night was a bumper affair ranging from a cut up Speedy boiler to see how it fared after twenty years, to a model of a coal mine winding engine.

Scale Marine Modellers

The theme for this years Easter Weekend exhibition was New Zealand related models, ie, models of NZ merchant ships, men o' war, tugs, launches, yachts and ferries.

A strong wind put all ten members and their commands to the test with the wind getting ten points and members nil! The tug towing was very interesting, with great difficulty deciding who was doing the towing, the tug or the barge, and that was before trying to get through the gates without hitting the marker buoys!

ASME Inc. and SMM shared facilities

Location: Peterson Road Reserve, Waipuna Road, Panmure

Public Running: Every Sunday

Blenheim NZ

The Marlborough modellers will be hosting the 2000 Model Engineers Convention on 6-11 January, 2000. The Marlborough modellers consist of Aeromodellers, Boates and Engineering. Brayshaw Park is an area of private land on the south-west side of Blenheim. It is shared by four societies and regular public open days are held.

Working bees are held every Saturday morning and it is hoped the new level track will be completed by late 1998.

Marlborough Associated Modellers

Location: Brayshaw Park, Blenheim

Public Running: 1st Sunday

Invercargill NZ

It has been decided that the hall floor shall be refurbished in the near future. Also, the committee have been obtaining quotes to re-

roof the clubhouse. The club has been the recipient of the number of framed photos of railway scenes which have been kindly donated. These will be hung in the hall and the train shed. The portable track was used on the weekend of the Invercargill Summer Festival. Planning for the "Great Little Train Show" on the weekend of 10-11th October continues.

Southland Society of Model Engineers Inc.

Location: Surrey Park, Invercargill

Public Running: None

Bankstown NSW

The society is back in action after being hit by the vandals in late 1996 and early 1997. However, as we are in a public park, the graffiti artists still target the clubhouse.

Due to the very generous donations from other model engineering clubs and steel from manufacturers, we have been able to get the ground level 5" gauge railway back in operation. Additional sidings have been installed in the ground level track. Also, extra trees have been planted to assist in the landscaping.

A sponsors day was held on the 29th March, to show our appreciation for their efforts in assisting the society get back on track. Three new riding cars have been completed and these will have the logos of the sponsoring firms on their sides.

The Society's portable track has been in use at various locations helping us to raise funds for the above repairs.

Works is still being carried out on the elevated track and this is expected to be completed later this year.

Bankstown Steam Locomotive Co-op Ltd

Location: Ruse Park, Cottam Ave, Bankstown

Public Running: 2nd Saturday, except January

Petone NZ

At the March meeting, some 14 members were treated to an evening of nostalgia with film, video and restoration projects.

Hutt Valley Model Engineering Society Inc.

Location: Marine Parade, Petone

Public Running: Every Sunday

Fairfield NSW

The numbers at the Wednesday group have been down a bit due to illness. However, work on the upgrade of the track has been progressing steadily.

Western Districts Live Steamers Co-op Ltd

Location: Fairfield Showground, Fairfield

Public Running: Every Saturday, 3rd Sunday

Maidstone NZ

The March meeting was very much a show (and tell?) night with many members bringing along parts of their latest projects.

The last few working bees have successfully dealt with the areas which have niggled

various consciences. A bit more needs to be done in preparation for the track's two yearly certification inspection.

Maidstone Model Engineering Society

Location: Maidstone Park, Upper Hutt

Public Running: ???

Perth WA

Work has been progressing on the re-habilitation and stabilisation of the grounds which caused the closure of the railway in January. By the time you read this, public running should be under way again (see *Convention report on page 37.*)

Castledare Miniature Railways of WA Inc.

Location: rear of 100 Fern Road, Wilson

Public Running: 1st Sunday

Nelson NZ

The "Santa Specials" runs before Christmas were very successful with plenty of public visiting and having rides. The Christmas holiday runs attendance was up and down. It was suggested that maybe later runs (into the twilight) next year would be more popular.

The Nelson society will celebrate its 40th birthday later this year. A modellers rally will be held on the 26, 27 and 28 September.

Steady progress is being made to ensure finance for the new clubhouse. A retaining wall as being built to raise the ground level.

Nelson Society of Modellers Inc.

Location: adjacent to Tahunanui Beach, Walkare St, Tahunanui

Public Running: 3rd Saturday

Tauranga NZ

Many members have responded with suggestions for the "5 to 15 year plan". The new tunnel is now in place and the track re-installed. The tunnel sections were positioned so that an additional track can be laid for future storage of rolling stock in the tunnel itself. The open weekend was a fairly quiet visitor wise, as expected as it closely followed the Expo '98.

Tauranga Model Marine and Engineering Club

Location: Memorial Park, Tauranga

Public Running: Every Sunday

Rotorua NZ

The good news is that the members and friends of the Rotorua society have rallied and the club is preparing for a new lease of life. The publicised closing of the society has been thwarted and the (arguably) most scenic miniature railway will again be subject to the sight and sounds of steam and diesel. A "revival" Open Weekend was set down for 25 and 26 April. Considerable refurbishment of the track and buildings has taken place, including reinstatement of the 3½" gauge rail.

Rotorua Society of Model Engineers

Location: Te Amorangi Museum, Robertson Avenue, Holdens Bay

Public Running: 2nd Sunday

Cobden Vic

On Thursday 26 March the Cobden club had an open day of a different sort. A pilot-less runway aircraft left a one kilometre trail of destruction between the Cobden Airfield and the Cobden Miniature Railway, where it stopped after hitting the toilet block. In its dash it broke through three fences, a boom gate and clipped a storage shed. Damage was estimated at about \$3000.

South Western Model Engineers Inc.

Location: Grayland Street, Cobden

Public Running: 3rd Sunday

Mackay Qld

The annual May Day long weekend, which this year celebrated our 20th year, was the most successful ever. The high point was the official opening and dedication to Len Heaton of the Paget Signal Box, performed by Mackay City Councillor Gordon Noscoff, who incidentally convened the meeting in 1978 which led to the formation of the club.

The low point was on Saturday evening when one of the visitors from Townsville was involved in a 3-car collision and had his ute written off. Fortunately his loco only suffered minor damage.

Sunday started off slow due to the overnight rain, but by 10am the public started to arrive and kept coming all day, giving the new safety barriers a good workout. The shelter shed, picnic tables and gas BBQs which the council recently installed in the park were put to good use. AALS President Barry Glover spent the day with us on Sunday and during the evening BBQ, a two minute silence was observed while Neil Mackenzie played a Scottish lament on his bagpipes in memory of late life member, Lang Harvison.

Mackay Society of Model Engineers Inc.

Location: Muller Park, Planlands

Public Running: 1st Sunday

Mangere NZ

The Waitangi weekend impromptu open invitation had a reasonable turnout. The last working bee saw the commencement of relaying part of the prairie track.

Running days have been well attended.

Manukau Live Steamers Inc.

Location: Mangere Central Park, Robertson Road, Mangere

Public Running: Every Sunday.

Durban, South Africa

The preparations for the Durban Society's 85th Anniversary and 18th national Steam Meet in May continue at the grounds.

The elevated track anti-tip rails have been replaced with hot dip galvanised new ones. To accommodate the larger locos expected, alterations to the tunnable, and extensive alterations to the steaming bays and service roads have been completed. A further addition has been the installation of an extra 12 metres of parking bays.

The signalling system, in preparation for the meet has been completely replaced with new posts, lamps and trigger switches. The upper picnic area has been doubled in size by much levelling and in filling. An access bridge has been installed over the railway to the grounds.

The club has gone to a great deal of trouble to obtain the best quality coal (Eikeboom) for the event. The other non-descript coal has been removed.

The fleet of passenger trolleys has been refurbished, especially the bogies with their wheels being re-profiled.

Every requirement including a member's supervisory roster for the steam meet is now in place and it is hoped all who attend will enjoy their stay.

Durban Society of Model Engineers

Location: Kellaway Hall, Hinton Grove, Virginia

Public Running: 2nd Sunday

Galston NSW

The Santa Claus day at the GVR on 13 December last was a huge success. On 26 January, the Hornsby Shire Council held their Australia Day Bush Picnic at Fagan Park, with our boating members sailing their commands on the lake, the portable track was in use and there was also a stationary engine display. Proceeds went to the Fagan Park committee.

Good news at Galston is that the GVR land is getting closer to being our own property with over three quarters of the debentures being repayed. The club has gained three new members.

Several safety improvements have been completed at the grounds including the removal of dead and tree limbs. Work completed includes a new generator trolley being fabricated, additional braked bogies fitted to the Lindfield express, arboreal tunnel completed, and an area south of the entrance to Martin's Place has been terraced and two bench seats installed.

The Track Crew has reported that, after many years of good service, the main line track is in need of replacement.

The new clubhouse concept progresses (with our Honorary Architect submitting a plan) and much feed back is being received from the members and in concept suggestions.

A braking standard has been established in the club and will now become part of the operating code of the GVR.

What has your club been up to?

We all like to keep in touch!

Send a brief note to tell us!

Or post a copy of your **newsletter** — but make sure you use a highlighter pen to show the item you'd like us to publicize. Remember to concentrate on news that appeals to AME's wide range of readers.

A special running day was had in March for a local kindergarten. A total fire ban excluded steam motive power, however, four trains were ably run with the available "diesel" power at the head end.

Hornsby Model Engineers Co-op Ltd

Location: 29 Mid Dural Road, Galston

Public Running: 2nd Sunday each month

Eltham Vic

The new roof over the passenger race area and ticket box window has been completed, and the canopy over platforms 2 and 3 is almost finished. Work progresses on the new 81 class with the bogies ready, mainframe under way and a new Perkins diesel engine on hand. On the track, the 75th and 76th point/diamond crossings have been installed and work is proceeding on construction of the new Up line between Meadmore Junction and Diamond Valley

Diamond Valley Railway Inc.

Location: Lower Eltham Park, Main Road, Eltham

Public Running: Every Sunday and public holiday except Christmas

Cape Town, South Africa

Members have been experiencing much frustration with bureaucracy which has delayed progress on their new site at the 5th Avenue Sports Complex in Parow. Approval for the new club building cum workshop was given quickly, the building to comprise two pre-cast concrete garages with the hall to be constructed between them. After interminable delays with foundations, water mains etc. the club is now at the stage where they can expect to see more rapid progress.

Western Province Live Steamers

Location: 5th Avenue Sports Complex, Parow

Durbanbah NSW

The Tweed Valley Miniature Steam Railway Inc is a club situated in the Tweed Valley on the far north coast of NSW. The track, of some 900 metres, is owned by the tourist resort of Tropical Fruit World, and is on a man made island. The facilities, although small in comparison, feature storage shed, traverser, steaming bays and a station with by-pass line. Our membership is limited in numbers. This 7 1/4" track operates 7 days a week but our running days are 2nd and 4th Sunday. Phone (07) 5524 9027, Fax (07) 5524 3001

Tweed Valley Miniature Steam Railway

Location: Duranbah Road, Duranbah

Public Running: 2nd and 4th Sundays

Have you noted AME's new address yet?

PO Box 21

Higgins. ACT 2615

Phone/Fax: (02) 6254 1641

E-mail: ame@dynamite.com.au

Coming Events

4 to 5 July

2nd Annual National Modellers Exhibition — Bendigo Vic

Bendigo SME invite you to what is becoming the best model exhibition in the country. Open Sat 9am to 5pm and Sun 9am to 4pm. Several Categories for Exhibition and prizes. Venue is Kangaroo Flat Leisure Centre, Browning Street. For info. & entry forms contact Events Bendigo Inc PO Box 36, Bendigo 3552. Ph (03) 5444 4144

1 August

Grandchester Qld - Grand Opening

New 5'7 1/4" track opening in conjunction with Qld. Railway Heritage Weekend (birthplace of QR 133 Years). 2 Ipswich Rd, Grandchester. Mark (07)5465 5768. Unfortunately, no running September 5 and 6 but back to normal in October

8 - 9 August

Blowfly Rally — Wollongong NSW

Hosted this year by the Illawarra Live steamers. If you are building or wish to build a Blowfly, then Wollongong is the place to be in August.

22 August

AALS Interclub Run — Moorabbin Vic

Hosted by SLSV, Rowans Road.

3 to 6 September

Major Centenary Exhibition

Hosted by the SMEE, (UK) 1898-1998, and located at Brunel University, Uxbridge, West London. Information from SMEE 100, Resources Exhibitions Ltd, 2 Forge House, Summersleys Road, Princes Risborough, Bucks, HP27 9DT, UK. Phone 01844 34 2894. Fax 01844 34 4988. e-mail: CRE@resourcecx.co.uk

5 to 6 September

Spring Festival Invitation Run — Maryborough, Qld

MELSA members invite you to their annual celebration in Queens Park. Track 3 1/2" and 5" gauge. Sideshows, entertainment and you won't go hungry. Contact Graham (07) 4121 4341

5 to 6 September

Central Coast Steam Model Co-op — Birthday Run

Come and enjoy a peaceful Fathers Day on the coast. Saturday is normal running day, visitors only carry passengers if they wish to. BBQ and night running. Sunday running depends on number of visitors who notify beforehand. Contact N Richards (02) 4344 4385 for further information.

26 to 27 September

Canberra Annual Floriade Invitation Run

Steam and Tulips at CSMEE's Kingston Miniature Railway 2 1/2" and 3 1/2" elevated. 5" and 7 1/4" ground level. Contact James Mitchell, PO Box 4462, Kingston. ACT

2604. Ph. James Mitchell (02) 6286 5936 or John Nicolson (02) 6247 7182

3 to 4 October

Annual Inter-club run — Port Augusta SA

Port Augusta Model Engineers will be hosting their 10th Annual Steam Up at the club track, Homestead Park, Elsie Street. 5" gauge track only, but everyone welcome to join in. Registration forms from the Secretary at 61 Edinburgh Tce., Port Augusta SA 5700 Ph. (08) 8642 3984

10 to 11 October

Invitation Weekend — Berry NSW

2km. of 7 1/4" railway and traction engine track. Camping, kitchen, BBQ, shower, loco storage. Located at B35, Princes Highway, Berry. Enquiries to Les (02) 4464 1304

17 to 18 October

National Traction Engine Rally

This year to be held in Canberra at the CSMEE grounds, Geijera Place, Kingston (next to the ARHS Railway Museum). Further details to be advised.

24 to 26 October

10th Anniversary Celebration — Gore NZ

NZ. Labour weekend, 10th Anniversary Celebrations and an open weekend at the Gore Model Engineering Club, Hamilton Park, Gore. Contact Secretary Timothy Shanks (03) 208 4382 for details.

31 October to 1 November

Wagga Wagga Invitation Days

5" and 7 1/4" track in scenic surrounds. Model traction engines, stationary models, boats, full-size historic engines, many tourist attractions and a great welcome. Contact: David Font (02) 6921 4762

6 to 8 November

Railx 1998 — Evandale, Tas.

The Evandale Light Railway and Steam Society are again staging their annual Railx, this year for the whole weekend. Track gauges 3 1/2", 5" and 7 1/4". Steam carousel, model railways, stationary engines, model aircraft, model boats, vintage cars and motorcycles, trade and swap tables. Prizes. Hot food and drinks. Contact is Graeme Reardon (03) 6344 6636.

8 November

QSMEE Trophy Day — Warner, Qld

This annual event is again being held at the Society's clubgrounds on the northern outskirts of Brisbane.

6 to 11 January, 2000

Model Engineers Convention — Blenheim NZ

Marlborough Associated Modellers are hosting this 2-yearly event. 2 1/2", 3 1/2" and 5" elevated and 5" and 7 1/4" ground level. Further details later.

Pressing GWR Safety Valve Bonnets

by Dave Smith

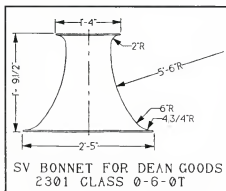
Method and photos by Cliff Kirby

If they are to look right, there are some items on a miniature locomotive that need to be made the same way as the full-size original. Such an item is the safety valve cover (or bonnet, as it was known) for a locomotive of the Great Western Railway (UK). From examination of the original it is seen to be made from three parts. A top flared portion, a bottom flared portion and a joining tapered middle section. The two flares were raised from flat sheet material and the middle from a rolled cylinder. They were mostly hand made by craftsmen sheetmetal workers.

Many models use a bronze casting for this but the result is wrong on two counts. One, without great care it is practically impossible to machine the casting to the correct scale wall thickness hence it will always look like a casting and, two, the original was polished BRASS!

For models, such items have been spun but it is a difficult process for the amateur if the end result is to be to a specific size and without ripples or wrinkles.

Cliff has a stable of GWR locos - a 3½" Broughton Grange, a 3½" narrow gauge Vale of Rheidol Owain Glyndower and, the latest still under construction, a 5" pannier tank engine. The Grange has a bonnet turned from solid brass rod and that for Owain Glyndower was professionally spun by a friend over a two-piece steel former made by Cliff.



Unfortunately, the friend who did the spinning died some while ago.

After a few attempts at spinning the bonnet himself for the pannier tank without acceptable result, Cliff devised a method of pressing the bonnet components from brass tube. The tubing chosen was 1½" x 20 gauge for the top and 1¼" x 20 gauge for the bottom sections. The model bonnet is made from only two pieces, not three as full size, and measures approx 1½" dia at the top by 2¼" dia at the bottom by 2½/16" high.

For each size bonnet two steel mandrels, top and bottom, were turned to the correct flare profile and inside dimensions. Surfaces were finished as smooth as possible. A counterbore was machined in each to provide a

register for the nose of a further plain, parallel mandrel which was a slip fit in the stock tubing. This last item supports the length of tubing from longitudinal collapse during the pressing operation.

The two ends of each tube were squared off in the lathe and the "leading" end, the one on which the flare is developed, given an internal bevel to assist movement over the mandrel. For the same reason, the mandrels are kept well greased. The leading end of the tube was annealed with a propane torch for about the first ½" and water quenched.

With the support mandrel inside the tube and its nose registered in the flare former the assembly was transferred to the bench vice, lined up and given the first squeeze. Like a football fan's head being inserted into his club-colours beanie on Grand Final Day, the tube started to bell out as required. Well, the first bit did, anyway.

Alternating between annealing and pressing, the required flare diameter was reached in about five squeezes. Each time, the support mandrel was returned to the lathe to shorten it and keep it about ⅛" less than the remaining tube length. This kept the support to a maximum and also limited the forming stages to ⅛" steps. To ensure the job didn't get "drunkenly lopsided" no single squeeze was taken in one fell swoop but in small increments with



Mandrel for bottom flare, stock tube, finished pressing cut to length and wooden support mandrels with progressively shorter lengths



Mandrel for top flare, mandrel for taper, stock tube and flared tube before cut to length and tapered.

the job being rotated in the vice from time to time.

The bottom flare was developed in similar fashion and both pieces were parted to length from their parent tube while on their support mandrels in the lathe. After another annealing, the top flare had a plain taper mandrel forced into it in the reverse direction to form the middle taper. The bottom flare then had its short bit of remaining parallel made smaller by peening with a flat polished hammer on a plain round bar until its diameter matched that of the corresponding part of the top portion of the bonnet.

The two "halves" were fixed together with SBA245 (45% silver brazing alloy) and the join rendered practically invisible by discreet filing, then emery and finally buff mop polishing. The material thickness of 20 gauge is sufficient to allow dressing out of surface irregularities, which by this method are few, with no danger of becoming too thin for service.

From some large diameter brass bar two rings were turned with a small "D" cross section and parted off. These were soldered with 965 (5% silver HMP solder), one to the top and one to the skirt. These represent the rolled over edge finish of the full size.

The example shown is intended for the flat top of a Belpaire firebox. Should a bonnet be



From left — flared components, after joining with SBA245, dressed and polished bonnet

required for a taper boiler barrel, such as a "Manor" or a "King", then the bottom flare needs to be finished to shape by hand beating methods, preferably before the bottom skirt ring is added.

As the steel tube support mandrel requires lathe work to shorten it each time, an alternative is to turn the same from wood and part off a series of them each a little shorter than its predecessor. [See photos]

Many other railway companies, not just GWR, had similar valve covers on their locos (particularly in the earlier years) so the method described may be applied whenever a

thin wall, open top casing is called for. It need not even be circular but then the mandrel(s) would need different production methods.

The above may read as being quite time consuming but, in fact, the pieces formed quite rapidly and the machining time for the mandrels was no more than that expected to machine a casting. Another advantage is that the mandrels are to hand for further bonnets as needed. Those shown have already produced formings for the pannier tank, a *Dean Goods* and a *Torquay Manor*. Most importantly, the end product looks right!



Making a Morse No 2 Taper

by Ted Crawford

A Morse taper may be needed for various reasons, especially for headstock use if the chuck accuracy is too unreliable for repetitive work that may have to be removed for checking and then replaced for further turning operations. The scroll accuracy of the three-jaw chuck is not likely to be better than .001" to .003", even for a good example, and a collet should always be mounted on a Morse taper assembly. Therefore there is a good case for being able to make a reliable Morse taper, to have on hand whenever it is needed with minimal disturbance to the lathe set-up.

The problem with making a Morse taper is getting the angle right. Turning between centres is a very good method but this involves disturbing the tailstock, the centre of which has to be correctly located for accurate drilling. So if the tailstock is to be left alone it becomes necessary to use the rotation of the top slide to obtain the required angle, and what follows is a description of how this angle was set so that three Morse tapers were successfully turned on a Myford ML10 lathe which had dials calibrated in thousandths of an inch. The dimensions are therefore all in Imperial sizes.

A clean 4½ inch length of ¾" diameter mild steel was tightly chucked so that three inches were free for turning operations. The gibbs on the top and cross slides were also tightened to

give free movement without a trace of shake. The top slide angle was set to zero as well as could be judged from the scale and the locking screws set. The tool height was then set to +0, -.010" of the centre height. It is easy to prove that within those limits the taper error due to tool height is less than .006".

Next a skim was turned off the stock so that a true surface without any out-of-parallel errors was available for a reference. This operation has to be done using the leadscrew only, avoiding the use of any top slide adjustment after the turning operation starts. For convenience the top slide was set so that the tool was close to the chuck-end of the top slide travel before turning was started. This was to enable the top slide to be unwound at least 2 inches later.

Back off the cross slide about .010" and unlock the top slide rotation lock screws. Turn the top slide anti-clockwise by 1.5 to 1.75 degrees and re-lock the screws. Unwind the top slide until the tool is about 2½ inches from the chuck but leave it, for convenience, with the zero on the dial at the index mark with the backlash taken up. Wind in the cross slide until the tool just touches the stock and then advance the top slide exactly twenty turns (equals two inches) towards the chuck. An error here of .004" in 2 inches will make only .00001" error to the taper. Put a .050" feeler

gauge between the tool and the stock. A residual gap of .005" to .015" may be expected as the angle was deliberately set a trifle too large. Unlock the set screws and rotate the top slide so that the feeler gauge is firmly slipped. Tighten the locking screws.

Once more back off the tool and unwind the top slide exactly 2 inches (twenty turns) out. Reset the cross slide so that the tool just touches the stock then wind the top slide exactly 2 inches in as before and repeat the operation with the feeler gauge, always taking precautions to avoid errors due to backlash. After three cycles of adjustment it will be found that there is no significant residual gap to worry about and the angle for the Morse taper can be considered set. The angle for a No 2 Morse taper is such that the difference in diameter over a two inch length is 49.95 thou but 50 thou will be practically the same. To be exact add 1.6 thou to the 2 inch movement.

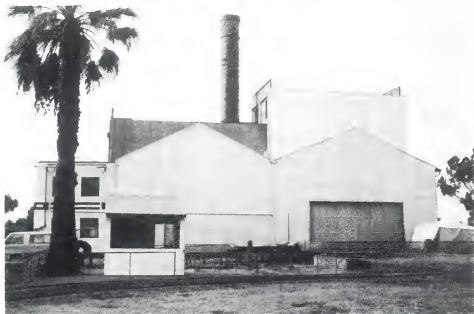
For those with only Metric equipment, use a 1.25mm feeler gauge and move the top slide 50mm instead of using 50 thou and two inches.

With the angle set in that way there should be no further problems in making satisfactory No. 2 Morse tapers. The usual maximum OD. is .720" and the length 2½ inches giving a minimum OD. of .595".



The Museum Miniature Railway, Yanco

Story and photos by John Nicolson



The dominant feature of the site is the old powerhouse. The track can be seen in the foreground and the small white structure to the left is the ticket office.

Sunday 12 April 1998 marked the unofficial opening of a new 57 1/4" dual gauge track at Yanco in the Riverina of New South Wales. Less than 12 hours after being granted affiliation to the AALS, at the meeting in Bunbury, WA, the first passengers were being carried on the new track. This did not happen overnight. A small dedicated band of workers from Leeton, Yanco and surrounding districts had been working hard for a year to complete the track in time for the Easter Rice Bowl Festival.

The track is located on an interesting site containing The Yanco Powerhouse Museum. The powerhouse itself closed in 1961 and the entire contents were removed and sold for scrap. The building and smokestack still stand. After the replacement of thousands of window panes that had been smashed by vandals, it now houses a growing collection of exhibits collected from local sources. The powerhouse itself must have been a microcosm of early twentieth century power generation. It had been equipped with large coal-fired boilers and steam turbines. Water for the boilers and to cool the condensers was stored in earth dams next to the standard gauge Riverina railway which parallels the site. A spur from the railway led to a track over the concrete coal bunkers where coal, supplied by rail, was stockpiled for the powerhouse.

The miniature track runs around the site in a kidney shape with the powerhouse in the concave side and the remains of the coal bunkers enclosed by the circuit. There are possibilities for a bridge using the concrete sides and dividers of the bunkers as supports and

the club has plans for track extensions. Other possibilities include bridging the water storage dams and running a track along part of the roadbed of the access spur to the coal bunkers.

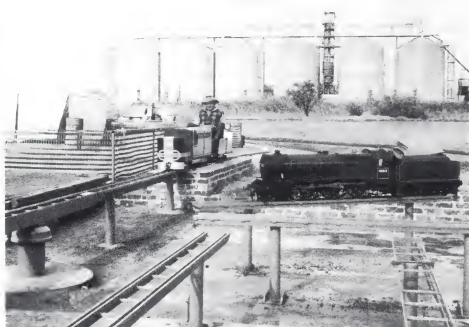
The track is about five hundred metres long and is surrounded by young trees planted by the Rotary Club. These are soon to be supplemented by 200 more, courtesy of Greening Australia. The track is of welded construction, laid in ballast overlaying a compacted but well drained sub grade. All turn-

outs are of the moveable frog type with bladed "K" crossings. A challenging grade of one in forty is encountered after leaving the station, easing to a long steady climb, parallel to the main railway line (former trackbed of coal siding) followed by a gently curving descent to the servicing loop on one lobe of the "kidney" near the powerhouse smokestack. An overhead water tank is sited by the loop and supplies of char were on hand by the tank. After rounding the powerhouse, trains pass a facing point turnout leading to the steaming bays. The track then divides into a station loop and bypass track which rejoin each other just before commencing the climb again. The well-equipped steaming bays are serviced by a turntable and a traverser unloader.

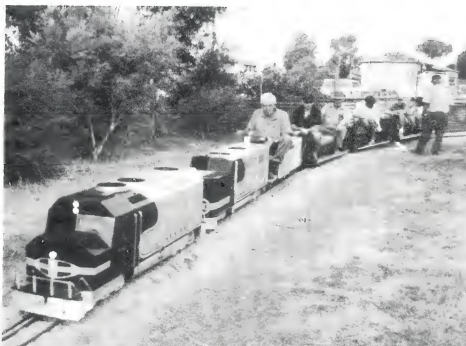
A group of willing members, led by Ivan Evans and Terry Ward, assisted by Warren Kirkup, Steve Lewis (who built the ticket 'shed') and Ian Fulton, passed the word around that they would appreciate the help of a few model engineers from nearby clubs, to help in a 'low key' test run of the new facility. Engines, both steam and internal combustion, came from Canberra and Wagga Wagga to



Les Mouat gives the AME diesel a run



The view in a different direction. The steaming bays with Ivan Evans' Royal Scot in residence and one of Kel Broughton's diesels coming in with Ivan at the controls



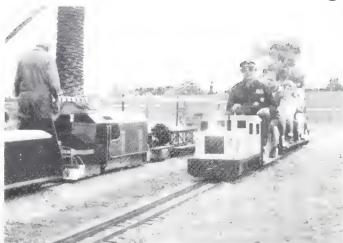
Kel Broughton has his two Santa Fe diesels running in multiple on this occasion



Ivan Evans pulls out of the station area with a load of passengers while Station Master, Allan Brumfield surveys the scene.



Local member, John Peel from Jerilderie had a good run with his narrow gauge 2-4-0



Wagga Wagga club president, John Lennon appears to be enjoying his drive of Cec Apelbee's industrial diesel

supplement the two available local steamers. Visitors from Wagga Wagga included Stew Pottie's *Heidi*, Jim Lietche's *Anne*, the AME 422 and Cec Apelbee's Lambing Flats industrial diesel. From Canberra, Kel Broughton's two freelance Santa Fe diesel outline petrol electrics worked in multiple unit to haul the new articulated three-pack, described in the last issue of AME. Dave Balls brought Canberra's 7 1/4" gauge freelance industrial switcher and an extra riding car. A locally built 1 1/2" scale model of a 422 diesel with a petrol power plant and mechanical drive, was brought along by the father and son team of Mike and Matthew Waide.

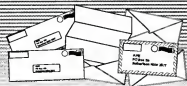
Although the run had not been strongly advertised, the locals obviously knew about it and began arriving in significant numbers from about 10 am on Easter Sunday. By 11.00 six trains were orbiting the track and the queue by the ticket office ("shed") seemed constant. The crowd favourite was Ivan Evans' award winning Royal Scot, performing in public for the first time at what is now its home track. Allan Brumfield of traction engine fame was too busy as station master to even fire up his tractor on the Sunday.

Later in the morning, these trains were joined by another local steamer, John Peel's 2-4-0 from Jerilderie, which is quite a large narrow gauge "Baldwin-like" design equipped with a novel boiler. The crowd remained fairly constant until lunch time in spite of many other attractions, including hot air balloons and camel races at the local racecourse. The Rotary Club brought their mobile catering unit, selling hot snacks, soups, teas and coffees, which were very welcome since the weather was overcast and surprisingly cool after the hot summer and early autumn.

Alas! In the early afternoon, drizzling rain slowed the flow of passengers, but a few stalwarts still came to ride and the day ended most successfully for the club. It earned its first income and several new members signed up. Plans are to commence regular runs on the last Sunday of the month, once the rolling-stock fleet has been built up.



Letter Box



NZ Expo models

Sir,

You request information on the IC engines and other models (page 28 AME March-April) in the recent NZ International Model Expo.

These were constructed by W R (Bill) Janes of Tauranga and are as follows:

The Cirrus and Wright Whirlwind both from plans in the *Strictly IC* magazine. Work included making the necessary patterns and on to the manufacture of all ignition components (including spark plugs) and finally the propellers.

The Brighton Terrier was constructed some years ago from ME plans. The triple expansion engine is to O B Bolton design and again, from castings made from Bill's patterns. Also in the show was a 5-cylinder Kinner Radial from plans published in the *Strictly IC* magazine and a 4-cylinder water-cooled "Green" aero engine. The latter was scratch built based on full size drawings, circa 1913.

The four IC engines and the triple expansion steam engine were completed within a period of 2½ years. All are finely detailed, as evidenced by the photos, and are working models.

Rob Moxham
New Zealand

BSW to BA conversion

Sir,

I was very interested to read Warren Williams' short article, with tabulated data, on BSW to BA conversion (AME March-April). These data must be used with great circumspection, not because one would require a magnifying lens to work down to 20BA (¼" BSW equivalent for the 1/12 scale data that are quoted), but for a totally different reason.

The strength of a bolt or stud made from a metal with a constant breaking stress, which is expressed as a force per unit area (and in whatever units one chooses to use), is dependent on its cross-sectional area — say across the root of the thread intension, or across the plain diameter in shear.

Cross-sectional area is not a linear relation, but varies as the square of the linear dimension. Thus if one reduces the diameter, say at the thread root of a bolt or stud, by one half, the area is reduced by a factor of four, i.e. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. Therefore for a given scaled loading, the stress at the root of the thread would be

increased and not remaining constant. Taking as an example the case of 20BA and ¼" BSW across their OD's, the difference between the two diameters as a linear relation is $0.25/0.0189 = 13.23$. But the important relation from the point of view of stress is the square of 13.23 = ~175. What this means in practical terms is that if one takes a ¼" diameter rod and one of 0.0189" diameter — whereas the ratio of the diameters is a mere 13.23, the shear load at failure of the smaller rod would be 175 times smaller. One can work out similarly, the equivalent ratio of the tension stresses to failure at the root diameters of the threads. Obviously safety factors are incorporated in full scale practice so that studs and bolts do not only fail under their design loadings, but permanent set is held to a minimum, i.e. stretching beyond the true elastic limit. A safety factor would normally lie between 2 and 3, not 175! Situations demanding higher safety factors would involve the once-in-a-lifetime concept, but not for our models though.

As I do not wish to leave anyone reading this letter confused on why I have differentiated between tension and shear stresses, let me explain. The only type of stud in which the tension stress is the same as that at the root of the thread is one which is reduced in diameter — "waisted" beyond the thread to the thread root diameter. We model engineers do not often resort to this type of stud because we are either using studs or bolts to hold items together, the studs being tightened to provide a suitable tension loading, or their shanks are being used to take shear loadings, when they probably do not have to be so heavily tightened. (Waisted studs are usually tightened to a specific stretched within their elastic range to provide an experimentally determined pretension loading, which is applied with the use of a torque spanner). The vast majority of bolts and studs that we model engineers use are commercially manufactured, and they almost invariably have a diameter the same as the OD of the thread.

Ideally, the scale cross-sectional area equivalents should be worked on the basis of the squares of the diameters of the bolts or studs, or the inverse of the squares when going down in scale. To take the example of 1:12 scale for a ¼" OD bolt or stud, the cross-sectional area is what needs to be 1/12 smaller, not the diameter. The relative diameters are now determined by the square

root of the bolt diameter to give an area 1/12 times smaller. The square root of 12 = 3.46 to two significant figures.

Using this concept does nothing at all for the dimensions across hexagon flats to achieve the 1:12 scale effect and this is where compromise has to be considered. Model engineering, of necessity, introduces compromises at some stage or other, and the smaller the model, particularly if it is intended to be a working model of a full scale prototype, the greater the compromise. Otherwise there would be inadequate strength in some of the components to take the stresses that are set up in working models. If you are not scaling down a full scale prototype, then you can adopt different scaling criteria within reason, without attracting criticism.

If one really did scale down everything on a model by the linear dimensions from a full scale prototype, at 1:12 scale there would be some mighty small items to deal with! I would hate it!

There are very useful data in Warren Williams' table. All I am saying is that look at your specific applications very carefully, and then decide on what compromise you can tolerate.

Finally let me say that I am open to criticism on the points that I have raised and possibly the subject could lead to quite interesting alternate views being expressed in these columns. But model engineers must not forget that we cannot escape the fundamental property of the strength of materials.

Mike Thurgood
South Africa

Another unfortunate experience

Sir,

I would like to reply to Peter Royal's letter in the March-April issue of your very fine magazine, called "an unfortunate experience".

I have had the same experience. I tried to join the same club and had the full sub in my hand. I was told I had to serve a twelve month probationary period, which included many attendances on Sunday mornings to clean the track of weeds and various debris. I find this degrading and a killer of enthusiasm and incentive, and is no way to welcome new members. Needless to say, I did not join and have lost interest in steam locos.

The trouble is that if you want to build steam locos, you have to join a club to get your boiler passed, and the clubs know it. It seems you are over the proverbial barrel — you either have to knuckle down, or in my case, loose interest in steam locos.

Laurie Sutton
Victoria

20-10s and hypotheticals

Sir,

James Tennant strays a bit perhaps with comments about British Rail Nationalisation and stop-gap locomotives (AME May-June). James can't be answered properly on that question unless we go delving into politics,

and that is not the intention of our magazine, I am sure.

However, as a reply to James, it should be remembered a lot of European countries were in a state of devastation after the War, Britain amongst them. This necessitated vast sums of money being spent in rebuilding, and not just on railways alone. Oil was costly and scarce but there were a lot of factories and railway workshops around looking for work and which could build locomotives, and there was plenty of coal and water, so why not build steam locomotives. Also Governments had to watch how money was spent if they wished to retain power. Enough of politics! Jim shouldn't forget NSW went into the 59 class Baldwins and the 60 class Garratts at this time too, Queensland went to Garratts and Baldwins and South Australia to Garratts, so who was the stop-gap? That great man of steam, O V Bulleid (Leader class man) said perhaps Britain should have retained steam for another year or two, by-passing the diesel era, and gone straight from steam to electric. Few countries have come near to doing that, exceptions probably being France, Switzerland, Japan, Norway, Sweden and Germany.

As for Australia, I had my own hypothetical, which I mentioned one time in discussion with that gentleman and rail enthusiasts' friend, the late Con Cardew. The 38 class would have been better built with 6'0" drivers and a 28" stroke, and why not a goods locomotive along the lines of the 38, with 5'3" or 5'6" wheels and 30" stroke and of the 2-8-2 wheel arrangement. He looked at me and thought for a moment, and put his index finger in front of his mouth and said Sssshhh! *Some things are probably better not discussed.*

I believe John Wakefield from South Australia, is into it again with a hypothetical from South Africa, one that was drawn and never built — a 2-10-2 or 2-10-0? Perhaps he might enlighten us about that?

Of course, as I got older and came in contact with more enthusiasts and more books were published about railways, I learned of such locomotives as the German Kriegslokomotiven (Austerity Locomotive) class 52, a two cylindered engine, T.E. of 45,000 lbs, and the class 42, a three cylindered engine with a T.E. of 54,000 lbs at 75% boiler pressure. 6352 class 52 and 843 class 42 locos were built in under three years. That was one of the hypotheticals Australia missed, plus large numbers of spares. (See *History of Railways* published in magazine form).

Then of course what would have been wrong with the Russian E class 0-10-0 design for our Australian needs, with 12,000 having been built. Then there is the poser, or hypothetical, for James that I read some years ago about the Russian rail authorities who worked out that running their trains at 60 Kph over a fixed section instead of 120 Kph, allowed more trains into the section in a 24-hour period, and therefore shifted more freight.

James mentioned British rail standard locomotives, and a good book for a model enthusiast, who would like to look further at these locomotives is "A Pictorial Record of British Standard Steam Locomotives" by E Talbot from the Oxford Publishing Co. There is a general arrangement drawing of each type with photos and details of various components as well as tender details. In Appendix 6 of this book, is an outline drawing of a hypothetical British Rail loco, which would make a great model in 5" or 7 1/4" gauge. It is a 2-8-2 with 5'0" drivers and a Britannia boiler.

In the mid 1960s, Lake Macquarie club visited West Ryde, and on their first 5" gauge track, a small ground level oval, I witnessed the first run with a 5" gauge 38 class and a black 2-10-0 British Rail Austerity class, which had difficulty negotiating the bend. I have a colour slide of them, but can't remember the owners' names.

Kevin Bruderlin
New South Wales

Oscillating engines

Sir,

The article, *A V-Twin Oscillating Engine* by Bob Ellis (AME May-June) has stirred the grey matter.

In late 1944 early 1945, as an apprentice, I was sent with a boilermaker and fitters (to work in the engine room), to a ship to do some repairs to handrails and a winch guard. The ship concerned was an American Army or Navy vessel named the *Barbera C*. There was a sister ship alongside, name now forgotten. They were timber vessels, about 120 to 150 feet in length. Fairly wide beamed, the hull was lapped with planks and the bridge and engine room midship.

I wasn't able to get to the engine room, but while repairing the winch guard, was able to observe the winch engines being worked on

by some of the crew. These engines were oscillating engines, and as usual for steam winches, a cylinder on each side of the winch drum. I've never seen oscillating engines like them before or since, not even as a model. The cylinders pivoted at their end and were upside-down double acting, with a port up each side. The pivot contained the ports for steam admission and reversing and exhausting, and if my memory is correct, this pivot was rotated to achieve the desired events for operation. (*The accompanying rough sketch, below, gives a general idea*). It was always in my mind to try and find out some more about those engines, but as most of us know, we can get carried off onto other things.

Dave Harper appears to be the bloke to help us out with this one, and enlighten us a bit more.

Kevin Bruderlin
New South Wales

Can you help?

(*The following is an unusual letter we have received from someone who is not totally familiar with AME. Is anyone able to help? ... Ed*)

Sir,

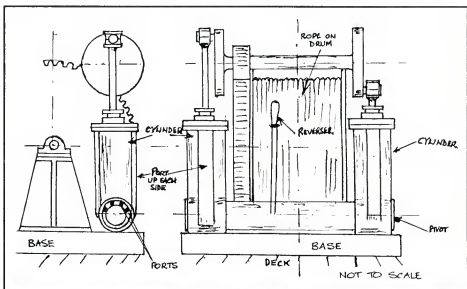
One of our customer(s) is urgently looking for gas and steam turbine model(s) for educational purpose(s). If this product falls in your product range, kindly Fax copy of your catalogue urgently, or kindly provide us some source from where we can (obtain) these model(s). Thanking you, looking for your help.

P D Sudhish
Najmat Burgan General Trading & Contracting Co

PO Box 2563, Safat. 13026 Kuwait

Fax: 00965-2426179

Ph: 00965-2426157



PO Box 21, Higgins. ACT 2615....
That is the address for all correspondence to AME now.

Articulated cars

Sir,

Thank you for having the courage to go with the 'apricot' cover last time - this could be a model engineering first you know!

I was particularly interested in the 'Articulated Safety Cars' developed by the Canberra people. Improving the traditional carriage design is something several innovative thinkers have been considering in recent times so I must commend the Canberra team on making a prototype and deciding to share their thoughts with us.

In trying to objectively evaluate the alleged superiority in performance this system provides, particularly for its potential in five inch gauge, forgive my ignorance, but I'm not sure exactly why they would be so much better! If somebody can enlighten me I'd be very happy to listen!

1. The use of larger wheels and sprung bogies will clearly improve the ride. However, I can't think of a single reason why a sit astride car of traditional design shouldn't be retro fitted with better bogies with the same startling results. The truth is that many of the major passenger hauling clubs around Sydney have upgraded their bogies on existing cars over the last decade with similar benefits.

2. With the articulated system there are less bogies in the train which would reduce drag on curves. However, nearly doubling the axle loading on the track and similarly reducing the braking potential by having less wheels can't be good.

3. Weight may be saved by having less bogies to haul around but this is likely to be well and truly offset by the additional structural weight of the car itself which has to span a greater distance between bogies than if they were mounted directly underneath eg. the end frames shown. Interestingly, the additional structural weight would be placed at a point higher above the rail than the bogie it replaces thus raising the centre of gravity of the car although this is of little consequence in the overall scheme of things.

4. The couplings are certainly robust although experience has shown the benefit of shearable coupling pins. In the event of one of those derailments where the car wedges in the trackwork stopping dead in an instant I've been thankful for a pin shearing rather than having the back ripped out of my engine. I've seen that happen too! Perhaps the coupling

between the engine and the set of articulateds caters for this.

5. Sit in gondola cars are more practical in 7 than 5 inch and have always proven very stable largely due to the broader gauge rather than any fancy design concepts. So saying, it was pointed out to me that by sharing a bogie the inertia of one car would naturally support the next should it try to tip and so on through the train. This could well offer real benefits in 5 inch gauge.

6. In the event sit in gondola cars were used then, as mentioned in the article, having the bogie beyond the end of the car would allow the floor level to be close to the track thus keeping the loaded C of G down.

The challenge in carriage design has always been to provide stability in rocking from side to side while still having sufficient spring travel to absorb lateral twists in the track along its axis. Over the length of a car the situation arises where the track tilts sideways that one bogie can be tilted to the left and the other to the right. In the length of a car travelling on apparently straight, level-across-the-rails-to-the-eye track this can be considerable. I have observed as much as 10mm on good quality 5 inch track over the length of 6 foot car. Presumably, by articulating, the middle bogie then has to deal with track variation experienced by two cars instead of one ie. perhaps over a distance of 4m instead of less than 2m. This could be a problem for 5 inch tracks. Incidentally, Warwick Allison of the Sydney Live Steam Locomotive Society (Ryde) has published a paper which very clearly illustrates these points.

This observation has led to quite a lot of discussion about the potential of a central spine type construction which would allow the twist to be accommodated by the frame rather than the bogie. Unfortunately, bolting a seat to the top of the frame of the car tends to stiffen the whole structure considerably. It would seem my own low budget, minimalist approach to making passenger cars has inadvertently resulted in

a light weight flexible frame that allows my unsprung bogies to function by virtue of twisting the frame to the shape of the track as it goes along!

Rome wasn't built in a day nor was it perfect first time. Experimenting with radical ideas and testing prototypes is the life blood of model engineering and oil in the gears of progress. I trust the Canberra people accept my comments as being constructive and continue to report to us their developments. I'm not a 'knocker', merely searching for an objective evaluation of the project. Keep up the good work!

Ross Bishop-Wear
New South Wales

Blowfly Rally

Sir,

Are you building or wishing to build a Blowfly? If so, then Illawarra Live Steamers, Wollongong is the place to be on 8 and 9 August. Even if you do not own a Barry Potter masterpiece, then you are still welcome to come and run your loco during this steamy weekend of Blowflys on our 2½", 3½" and 5" gauge elevated track and 5" ground level track.

Don't forget to bring your boiler certificate. AALS rules apply. Contact Ross Edmondson (02) 4284 4224 or myself (02) 9520 8186 or by e-mail at: dorwic@onenet.au

Warwick Aston
Secretary, Illawarra Live Steamers

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Letterbox Contributions

Contributions of letters by mail to: PO Box 21, Higgins, ACT, 2615 or fax to: (02) 6254 1641 are very welcome.

You can also e-mail your letters to: ame@dynamite.com.au

As far as possible, AME is an open forum for all members of our hobby. Therefore, all expressions of fact or opinion — as long as they are not libellous — will be considered for publication.

Please type or clearly print your letters, as script is often difficult for the typist to interpret. The Letterbox is a popular medium of expression, so space is limited. Therefore, letters of 400 words or less will have a better chance of being published.

News Desk



with David Proctor

How many of you noticed that this issue is 64 pages, four pages more than what has been the normal size. This has been done for two reasons — (1) to accommodate the large number of pages devoted to the *Bunyip* article without cutting back on our other content and (2) to give you better value for money because of the increase in subs that has been forced upon us. The subscription rate has gone from \$29 to \$32 for subscribers in Australia, the first increase for a few years. This has been forced on us by increases in packaging costs and bulk postage rates. Overseas rates remain unchanged.

The *Bunyip* construction series appears again after many years absence. As mentioned elsewhere, because of the time that has passed and the fact that many issues of the early AME are no longer available, the series starts at the beginning. Each instalment will be quite substantial, the intention being to

keep pace with those building the locomotive. Those of you who still have copies of the original will notice that the ground covered in this first instalment filled three episodes back then. Many of the drawings have been redrawn and they show metric and 7/16" gauge only. The drawings as well as castings will be available and details will be announced in the next issue. (The drawings will also be available with imperial measurements for those who prefer them).

John Campbell's tram riding truck did not make it into this issue as promised due to a lack of space brought about by the Convention report and the feature on West Ryde. It will be in the next issue, so that will give you a bit longer to get the tram finished. The truck is no good without the tram!

Injector Steam Valve

Ed Murrell has drawn to my attention that, with regards to Ross Forsyth's comment on

his valve design not being captive, it is nevertheless fairly safe. The pad or button which moves freely, is larger than the spindle thread and so would block any opening should the spindle be unscrewed and prevent the full blast of steam from hitting the operator. When the spindle is screwed back in all is well again.

Late cheques and credit cards

I have received several communications over the past two or three weeks from people who have sent in their subscription a while back and the cheque or credit card charge has not appeared on their statement. It has been said before and I will say again: **DON'T PANIC!!!** We are trying to keep our costs down as much as possible and one way to do this is to minimise bank charges. We bank only when we have a reasonable number of items to deposit. The bank like to charge us for the privilege every time we bank, whether it be one cheque or fifty, so we let them build up a bit. Bearing this in mind, if you are still likely to panic, give me a call **before** you go stopping cheques or cancelling card payments coz' that really fouls up the works!

G.E. tram controller

The photo of the tram controller on page 26 in the last issue is Keith Hartley's, not Lance Durham's as published. Sorry about that, Gents!

Clubs on the Internet

Paul Pavlinovich, the man who hosts the COALS chat line on the Internet has directed

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AME July-August 1998

my attention to his *Steam & Engine of Australia* site, which contains a database on every club which he knows of on the Internet. The clubs are broken into categories like model engineering, miniature railways, vintage machinery, etc. And he is working on a database of museums and coming events. So there you go, Net Junkies, you can check it out at <http://www.webmania.com.au>

Check <http://www.mackay.net.au/~ajl> for model car, train and machinery rallies and swap meets.

Talking of the Internet — have you checked out the AME site lately? There is an interesting special project waiting there for you. If you don't have a computer, find something else to do — like model engineering!

The importance of being safe

I was reading one of the English magazines, recently and one particular story caught my attention. It relates to an incident at the National Railway Museum in York.

In May 1997, one of two coaches on a miniature railway derailed after being driven at excessive speed by an inexperienced driver. Several passengers were injured, including one young girl who suffered head injuries. The incident resulted in a prosecution and the museum trustees were found guilty for failing to ensure that as far as reasonably practicable, persons not employed by the museum (the passengers) were not exposed to risks to their health and safety when riding the miniature railway. The result was a fine of A\$24,000 and costs of around A\$5000, which is being appealed against. (Acknowledgement to *Engineering in Miniature*)

MAPP Gas torches

I have received a couple of letters suggesting that AME run an article or review on torches using MAPP gas (a mixture of Acetylene and Propane). Has anyone out there bought one or have access to one and if so, would you be interested in telling us about it?

NSW 'S' wagon brakes

I have received a couple of requests for an article on 'S' wagon brake details. AME ran a construction article on the 'S' wagon in issue 59 (March-April 1995). Have you made brakes for an 'S' or any other wagon? How about you share it with us all.

Trade and Commercial

In case you missed it in the ads, **Camden Books'** fax and phone numbers have altered. They are — Phone: (0011) 441 373 830151 and Fax: (0011) 441 373 830516

E & J Winter have moved! They are now at: PO Box 124, Medowie, NSW, 2318. Their new Phone/Fax No. is (02) 4981 7999 and they have an e-mail address: ejwinter@ozemail.com.au

John Strachan from **Hobby Mechanics** has reminded me that he supplies some nice 'S' bogies, which could be adapted for articulated use.



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Model Engineer magazines, 306 copies between 1951 and 1964. Mint cond. Phone Terry (02) 4990 3946 (pref. Mid-afternoon)

Collet chuck ER-40 (NT 40 shank) unused, new, costs \$265, sell for \$185. Phone Vincent 0411 416 178

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Flash Steam, any current information, printed or operating. Write to R Carlton, 35 Brocklesby Road, Medowie NSW 2318. (02) 4982 8645

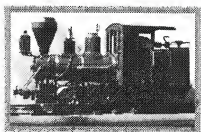
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Two Recent Additions!

Petrol-Driven Motor Cars [Lineham] £ 4.50

There is a huge amount of information on all aspects of the early development of the petrol-driven car up to 1909 in the 23 pages of this booklet. Included is detail information on the chassis, steering, wheels, transmissions, ignition, motors, and their balancing, all extracted from *A Text-Book of Mechanical Engineering*, published in London in 1909 although the contents cover British, European and American developments. 35 drawings and diagrams. Softcover.



Steamboats and Modern Steam Launches [ed. Durham] £52.65

In this bound volume of a magazine of the same name which appeared from 1961 to 1963 is more technical "meat" on all aspects of steamboating than you will find in any other readily available book; there is a huge amount of information within its pages, and it is fun to read into the bargain. *Steamboats.....* great advantage is that it was edited by a man who had had professional experience of reciprocating marine steam - you get the voice of real experience throughout its 660 pages, as well as a fair slice of history.

Because of its magazine origins, you have to dot about to find specific information. But you come across undiscovered gems in the process - and there is an index. If you have the slightest interest in steamboating, you MUST have a copy of this book. This new edition has an extra sixteen page article by Bill Durham, reviewing what has happened since he first started the magazine. Very heavily illustrated with over 800 photographs, drawings and engravings. Hardbound

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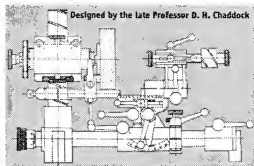


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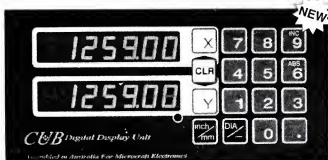
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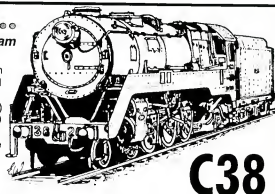
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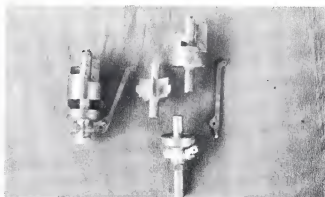


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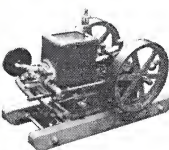
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Videos

South African Winter Steam

A look at reopened narrow gauge ex South African line in the east of the country and various Garratts hauling heavy coal trains on private colliery lines. All filmed in the spectacular winter months. 55 minutes.

Steam Fever

Another South African video which looks at various aspects of mainline operations in the final days of steam, including 'Red Devil' and a look at the Class 25 condensing locomotive.

Superlatives In Steam

Shows some of the world's largest steam locomotives in preserved working order on U.S. railways. Video includes shots of Nickel Plate Berkshire 2-8-4 no.765, Norfolk and Western 'J' Class 4-8-4 no.611 and Norfolk and Western 'A' class Mallet no.1218, said to be the most powerful steam locomotive still in working order in the world. Scenes on the footplate during running and detailed segments of the two year restoration of 1218 are also included.

Challenger Through The Rocky Mountains ...

This video records the 1991 trip across the US by Union Pacific 4-6-6-4 Challenger no.3985 and 4-8-4 Northern No. 844 from Wyoming to Sacramento, California. Cold conditions add to the spectacle of

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Byways of Steam 14

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Price: \$34.00



Early Diesel & Electric Locomotives of the NSWGR

As the name suggests, this book by Mick Morahan covers the 40, 41, 42, 43, 44, 4501/7001, 46, 48, 49, 70 and 79 classes. 224 pages with numerous high quality colour and black and white photographs. General arrangement drawings of each of the classes, including cab layouts. Also included is a class comparison table of technical specifications.

Published by the NSW Rail Transport Museum.

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422 class loco drawings

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Golden Arrow (steam launch) drawings 1:1 scale
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Magic of Steam

A 40 min. EK video look at East German preserved steam at work in revenue service during 1989.

Destiny of Steam

A one hour video featuring mostly 1970s footage of the South Maitland Railways at work. A rare and historic insight into the workings of one of Australia's larger private railways.

Milestones in Railway Preservation (Australia) \$54.50

Written and directed by Graeme Belbin. Subjects, from Qld's 130 year old A10 No.6, to a Victorian R class leading 3 diesels on a 3200 ton night goods from Bendigo to Melbourne. Footage includes 3830 as well as rare archival scenes such as triple headers out of Lithgow in the 1950s and black 3801's supposed last run. Duration: 90min.

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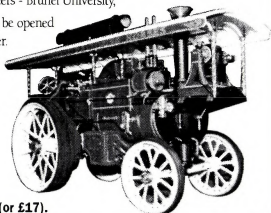
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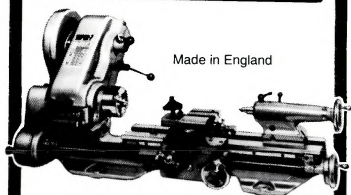
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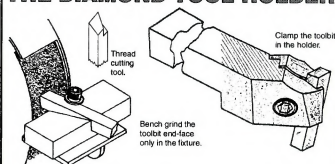
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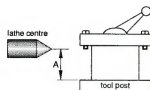
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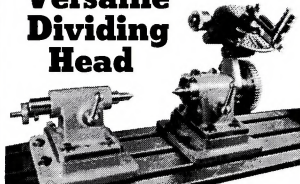
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